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EVALUATION OF THE TOBACCO DEMAND REDUCTION STRATEGY: TECHNICAL REPORT # 3

Social Context Issues

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Canada

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Report of the
Evaluation of the Tobacco Demand Reduction Strategy
Part III

Madhu Joshi & Associates

Report Prepared for
Strategic Planning and Evaluation Division
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This document has been prepared by Madhu Joshi & Associates. The analysis, conclusions and recommendations in this report are those of Madhu Joshi & Associates and do not necessarily reflect the views or policies of Health Canada or the Government of Canada.

This report presents the results of a review of selected surveys on smoking for their potential use in the evaluation of the Tobacco Demand Reduction Strategy. The review was conducted under a contract with Health Canada (Contract Reference H1021-6-9901. Workplan Number 18837). The review is solely based on the documents provided by Health Canada and did not include further analysis of survey information.

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EXECUTIVE SUMMARY

On February 8, 1994, the Federal Government formally launched a National Action Plan on Smuggling (NAPS). The Tobacco Demand Reduction Strategy (TDRS) was introduced, as part of NAPS, to counteract the increase in tobacco consumption that was expected to follow the reduction in tobacco taxes. An amount of $115 million had been allocated to the Strategy over three years ending in 1995-96. Health Canada was assigned the responsibility for the implementation and evaluation of the TDRS.

The evaluation of TDRS is currently underway. The evaluation study is being carried out in 3 parts. This report presents the results of the Part III of the evaluation study. The report comments on the usefulness of the results of smoking related surveys released in 1996, compares their results with earlier surveys (as appropriate); provides information (based on survey findings) on the changes in the prevalence of smoking, consumption of cigarettes, awareness and attitudes about the harms to health from smoking and exposure to external tobacco smoke (ETS); and comments on whether the changes in the indicators could be attributed to the TDRS. The report also includes the results of an examination of the relationship between provincial cigarette sales, "real" cigarette prices and "real" per capita personal disposable income.

The objectives of the Part III of the evaluation study

The main objectives of the Part III of the evaluation were to:

1. determine, from survey data and results of media tracking studies, whether there is sufficient evidence that there has been changes (increases or decreases) in the following indicators as a result of the introduction of the TDRS, and further, if these changes are statistically significant: a) smoking consumption and prevalence among the TDRS target groups, b) awareness/knowledge of the dangers of smoking and of ETS, particularly among TDRS target groups, c) public attitude toward tobacco smoking in general, d) changes in smoking policies in schools, health facilities, daycare centres, restaurants and other places accessible to the public, and e) changes in exposure to ETS in the home, the workplace and public areas.

2. determine whether, in light of the trends observed in smoking prevalence and amount smoked since the introduction of the TDRS, there is any evidence that the 1994 reduction in price had effect on tobacco consumption, particularly among Youth; and

3. determine whether the difference (if any) in smoking prevalence and consumption between provinces can be attributed to price differences.

These objectives are derived from the evaluation questions and indicators developed by the Evaluation Framework of the Tobacco Demand Reduction Strategy[1].

Information sources for the Part III of the evaluation study

Information for the Part III of the evaluation study came from the results of TDRS related surveys and other documents provided by Health Canada. As part of the Evaluation Framework of the TDRS, Health Canada had identified 10 surveys. Results from the following nine surveys were released before 1996:

1) Survey on Smoking in Canada (SOSIC), 2) Media Campaign Monitoring and Tracking Studies (Sage 1995), 3) Health Monitoring Study (Tandemar Research Inc.), 4) Youth Smoking Survey (YSS), 5) Canada's Alcohol and Other Drugs Survey (CADS), 6) Canada's Health Promotion Survey (CHPS), 7) National Population Health Survey (NPHS), 8) Canada Health Monitor (CHM), and 9) Study on Youth Smoking - Ontario, (SYS-Ont).

In addition, results from three more national surveys related to smoking were released in 1996. These surveys included: 1) National Longitudinal Survey of Children and Youth (NLSCY), 2) Surveys related to the Anti-Smoking Tracking Study carried out by the Sage Research Corporation (Sage 1996), and 3) 1995 Survey of Municipalities Related to Smoking By-laws in Canada. A more detailed technical report on the analysis of the Youth Smoking Survey was also released in 1996.

Reports from other surveys were also available for analysis. Annual data on provincial cigarette sales, "real" per capita personal disposable income, price indices for cigarettes and populations were obtained from Health Canada and Statistics Canada (CANSIM).

The analysis carried out for this report was solely based on documents provided by Health Canada. No additional data was collected and no additional analysis of raw survey data was carried out. These limitations may affect the conclusions presented in this report.

A review [2] of the results of the nine surveys released before 1996 indicated that:

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1 Tobacco Demand Reduction Strategy, Evaluation Framework, (May 1995)

2 Surveys on Smoking and Tobacco Demand Reduction Strategy Evaluation; Madhu Joshi & Associates (March 1996)

SOSIC, Sage, Tandemar and YSS surveys were specially commissioned in conjunction with the Tobacco Demand Reduction Strategy. These surveys were designed to collect information on awareness of health risks from smoking and external smoke, attitudes towards smoking, smoking behaviour and change in smoking behaviour after cigarette prices dropped following the reduction in tobacco taxes. In addition, Sage and Tandemar surveys were designed to assess the extent to which TDRS media campaigns reached the intended target population.

These four surveys will provide a wealth of information for modifying existing and designing new anti-smoking programs. However, they have a limited use in evaluating the effectiveness (incremental effects) of TDRS in increasing awareness of dangers from smoking, making smoking socially less acceptable and influencing smoking behaviour of Canadians. This is because of the existence of myriad other anti-smoking programs, absence of comparable baseline data and the timing of the surveys in relation to the media campaigns.

CADS, CHPS and NPHS are Statistics Canada surveys which have a few questions on smoking. However, these surveys have large national samples which provide comparable and reliable estimates of the prevalence of smoking over the last 30 years. They can provide data for regions as well as for specific sub-populations (e.g., males 15 to 19). However, these surveys collect information from persons 15 and over. They do not provide any information about youths aged 12 to 15. This sub-population is considered to be at a high risk for smoking. These surveys also exclude persons living on army bases and in institutions (prisons, hospitals, etc.), and residents of NorthWest Territories and Yukon. The surveys use a Random Digit Dialling method for collecting information through a telephone interview. This method has a high probability of excluding people with no telephones (e.g., homeless, street kids, etc.). CADS, CHPS and NPHS provide only a limited information about smoking, consisting mostly about the smoking habits of respondent groups.

Canada Health Monitor is an ongoing cyclical private sector survey which includes questions on health and smoking. The methodology and question wording for all cycles of CHM surveys has remained constant. It can, therefore, provide comparable smoking prevalence data over time (trend data). However, CHM does not have a large enough sample to provide reliable estimates for smaller populations (e.g., pregnant women, etc.). The CHM also collects information from persons 15 and over.

Study of Smoking in Ontario (SYS-Ont) focuses on the perception of grade seven and nine student in Ontario about plain packaging of cigarettes and related issues.

Some times combining results of many sample surveys provide more reliable estimates. However, the target population, sampling and survey methodology, and time frame of the surveys have to be comparable. Most of the nine surveys reviewed have been conducted in

different time frames. There does not seem to be any advantage, at least for the purpose of TDRS evaluation, in combining results from different surveys.

None of these surveys provide reliable and prospective information to determine the effect of price changes on the smoking behaviour. The Sage survey provides some information on the changes in smoking behaviour after the drop in cigarette prices. However, the data do not show any clear trends. For example, while 20% teens said that they were smoking more since the price drop, 18% told that they were smoking less. Five percent adults were smoking more since the price drop while 15 percent were smoking less.

NLSCY is a long term survey designed to measure child development and well being. It is being conducted by Statistics Canada on behalf of Human Resources Development Canada. The cycle 1 of the NLSCY included children from 0 years (newborn) to 11 years of age. The long term goal of NLSCY is to follow and monitor these children into adulthood. There was no useful information for the evaluation of TDRS in the report for the NLSCY.

Health Canada commissioned Sage Research Corporation to conduct a tracking study in relation to Health Canada's 1995/96 public awareness campaign related to the TDRS. The main objectives of the tracking study included the measurement of attitudes and beliefs about smoking, identification of smoking, and impact of the campaigns on the knowledge, attitudes and behaviour. The methodology and questionnaires of the tracking study were similar to those used in the earlier tracking study carried out in relation to the 1994/95 media campaign. Results from the two tracking studies provide excellent information on the changes in smoking related beliefs, attitudes and behaviour from 1994 to 1995. The samples sizes of the tracking studies are not as large as those used in Statistics Canada surveys.

Health Canada conducted two surveys (1991 and 1995) of municipalities in Canada to obtain information on municipal by-laws on restrictions and prohibitions relating to the sale and use of tobacco products. These surveys are a useful source in examining pre- and post-information on municipal bylaws pertaining to smoking.

Additionally, Health Canada had commissioned three surveys (1990, 1992-93 and 1995) on non-smoking policies within schools in Canada. These surveys provide indicators of changes in school policies on smoking by students and staff. However, it is not possible to determine which of these changes could be attributed to TDRS and which could have taken place in the absence of TDRS.

Findings and conclusions of the Part III of the evaluation study

The main objective of the Tobacco Demand Reduction Strategy was to counteract the possible effects of the reduction in tobacco prices (following reduction in taxes on tobacco) on the

smoking behaviour of Canadians. It was expected that the number smokers and the amount of cigarettes smoked would increase due to the reduction in tobacco taxes. Therefore, TDRS was designed to discourage non-smokers from taking up smoking; encourage smokers to stop smoking or reduce the amount smoked; reduce the exposure of Canadians to ETS; increase the awareness about the ill-effects of smoking; and influence the beliefs, attitudes and knowledge of Canadians, particularly, in target groups. In short, the aim of the TDRS was to influence and change the smoking behaviour of Canadians.

The principal indicators for the measurement of the current smoking behaviour and changes in it are the prevalence of smoking and the quantity smoked. The prevalence of smoking is generally measured as the percentage of individuals in the population or the population sub-group who smoke at the time of the measurement or in a specified reference period. The amount smoked is usually reported as the average number of cigarettes smoked by smokers either per day, or per year.

The measurement of knowledge, attitudes and beliefs is more complicated. In particular, the measurement of the level of knowledge possessed or the strength of attitudes and beliefs requires sophisticated information and analytical tools. The indicators range from simple distribution of responses to binary or multiple choice questions, to composite indicators based on information obtained in surveys or in-depth interviews. Composite indicators may involve complex models such as factor analytical models.

The most relevant sources of information for compiling indicators of smoking related behaviour, knowledge, attitudes and beliefs are the individuals themselves. Sample surveys are generally used to collect such information.

Other indicators such as annual sales of cigarettes or tobacco products provide information on the society as a whole and can be used for macro-economic analysis. However, these indicators do not provide information on the smoking behaviour of individuals. These indicators can be used in developing national level policies but are not necessarily useful in developing policies to modify or change smoking behaviour of individuals in specific target groups.

The main conclusions of the Part III of the Evaluation of the TDRS are:

Smoking prevalence in Canada has been declining over a long period of time since 1965, and in particular since 1981. There was a sharp increase in smoking between 1978 and 1979 among young adults (15-19); and between 1990 and 1991 among males (20-24). Overall smoking prevalence had also slightly increased between 1990 and 1991. During this period, taxes and prices of legally sold cigarettes were increasing and the sale of smuggled cigarettes with lower prices was also increasing.

Despite the reduction in tobacco taxes in 1994 and an expected increase in smoking prevalence in response to lower cigarette prices, smoking prevalence has declined between 1994 and 1995. While it may not be possible to attribute this decline to TDRS, it could be due to a combination of all anti-smoking campaigns, restrictions on smoking in public places, anti-tobacco regulations, and advice provided by public health and medical professionals.

The real question is not whether the reduction in the prevalence of smoking from 1994 to 1995 is statistically significant or not, but whether it was caused by mass media campaigns related to TDRS and other external initiatives and the impact of which has now diminished.

A limited number of surveys have collected collected information on the number of cigarettes smoked. Also, the reporting of the amount smoked varied from survey to survey, making comaprison between surveys complicated. Data from the General Social Survey (1991) and four cycles of SOSIC surveys (1994 -1995) support the conclusion that the average number of cigarettes smoked by men has increased during this period and that smoked by women has remained about the same. No intermediate comparable data was available to determine whether the increase was due to a reduction in prices in 1994.

There are no comparable pre- and post- TDRS data on the number of cigarettes smoked per day by smokers. Therefore, it would not be possible to attribute any changes directly to TDRS or to changes in prices. However, the data from Sage surveys show that a few adults are smoking more as a result of the reduction in prices but three times as many adults are smoking less. On the other hand, more teens have reported that they are smoking more as a result of the reduction in prices and a smaller number - same percent as adults - are smoking less.

A very high proportion of Canadian adults and teens are aware of the adverse effects of smoking and ETS on health. Adults and teens both feel that the Health Canada (TDRS) campaigns clearly bring out the health issues related to smoking. Tandemar surveys found that Health Canada media campaign of 1994 was successful in informing the public about the adverse health effects of smoking. This survey also found that while the campaign message was relevant, not many people thought that it provided information they did not already know.

There were significant differences in the support for banning sponsorship of sporting and cultural events by cigarette companies. It is not surprising that the support for banning the sponsorship of sporting and cultural events and for totally banning the manufacture and sale of tobacco products is much higher among the non-smokers than smokers. The support is even higher among teen non-smokers than adult non-smokers. Approximately, the same percentage (between 15 and 20%) of adult smokers and non-smokers believe that tobacco is not as addictive as other drugs such as cocain and heroin. However, about two in five teen smokers believe that tobacco is not as addictive. There is probably more opportunity for educating early teens about the relative addictiveness of tobacco.

Almost two-third of adult and teen smokers are aware of dangers to their health from smoking. Because of many anti-smoking campaigns before and concurrent with TDRS, it is not possible to attribute public awareness and attitudes to specific campaigns (including TDRS).

Health Canada has developed a database on municipalites with restrictions on smoking in public settings under their jurisdictions. The database was built on the database originally created by the Calgary Health Services in 1984 and updated till 1988. Health Canada updated the database in 1991 and 1995.

The number of municipalities with by-laws on smoking in public places has increased by almost 33% between 1991 and 1995. Also during the same period, The number of municipalities with restrictions on smoking in hospitals has almost doubled. However, the 1995 database still has only 380 municipalities. Three hundred sixty municipalities out of 668 municipalities reached by the 1995 survey did not have any by-laws related to smoking. Caution should be exercised in interpreting data from the database. Powers for making by-laws with respect to smoking and delegation of powers to municipalities may vary from province to province.

In 1990 (before the introduction of TDRS), about 98% of schools had a non-smoking policy in one form or another. This percentage has more or less has remained the same. However, there is a significant increase in the number of schools (from 66% to 83%) with more stricter non-smoking policies.

In 1995, as part of a larger national study on smoking policies in a number of public settings the following surveys were undertaken:

a. a telephone interview survey of 100 large Canadian companies covering the four sector of retailing, food services and hotels, commercial landlords and bus terminals,
b. a survey of 2,396 (approximately 56% of such facilities in Canada) hospitals, long term and chronic care facilities, and other residential care centres,
c. a survey of about 2,554 (approximately 30% of such centres in Canada) licensed daycare centers, and
d. interviews of 198 daycare agencies for voluntarily licensed private home day-care.

Summary reports of these surveys show that a large percentage health care institutions, daycare centres and large commercial settings have policies to restrict smoking and reduce exposure to ETS. However, the level of enforcement on smoking policies varies from sector to sector and within each sector.

Most of the commercial establishments (typically with annual sales in excess of $100 million) surveyed have some form of smoking policy. About 55% of all policies designate indoor

smoking areas that are not separately ventilated, thereby, exposing the public as well as employees to second-hand smoke (ETS). If effectively enforced, only about 30% of all policies have the potential to protect the public from ETS.

Overall, 96% percent of all health care institutions surveyed have either a written or an unwritten smoking policy. With the exception of New Brunswick, over 93% of health care institutions in all other provinces have either a written on an unwritten smoking policy. The health care sector is acutely aware of the dangers of smoking and exposure to ETS. If enforced, 60% of all places could provide protection from second-hand smoke inside health care facilities.

The daycare facilities are much different from other public places. Children attending daycare centres are generally too young to smoke. However, all children, whether they are in a licensed daycare or a home childcare, could be subject to ETS, if there are no restrictions on smoking by the care givers.

Almost all (93%) licensed daycare centres have either written or unwritten smoking policies. Further, 51% of daycare centres with smoking policies ban smoking both indoors and outdoors.

Only 62% of daycare agencies regulate smoking in home daycare settings, 45% have written policies and 17% unwritten policies, 38% of daycare agencies have no policies restricting smoking in home daycare setting. This is not to say that all children in these homes are subjected to ETS, but rather that their exposure to ETS depends on the smoking practices of the home care giver.

Relevant data were not available to determine whether the TDRS has led to a decrease in the exposure from ETS in homes and workplaces. However, other information presented in earlier is consistent with a conclusion that exposure to ETS has decreased over the last few years. However, much of this decrease has occurred before the establishment of TDRS. It is not possible to estimate the changes in the exposure to ETS in homes.

Relationship between cigarette prices and smoking behaviour

Federal and provincial governments have always used tobacco taxes to raise revenues. Lately, the accent has shifted to curbing the smoking habit by making it more costly through taxation. When governments raise the sinful tax, it is useful for them to have an estimate of price elasticities of demand as a measure of the impact of their action on the consumption of tobacco.

A survey of existing studies shows that consumption of tobacco by all smokers falls less than in proportion to the price of tobacco. For Canada, for every one percent rise in the price of tobacco, consumption falls by only 0.3 to 0.4 percent in the short-run, and by 0.6 to 0.8 percent in the long-run. To achieve a targeted percentage reduction in tobacco consumption, therefore, price will have to increase by a larger percentage or the price hike accompanied by an active anti-smoking campaign.

A distinction is made between short-run and long-run price elasticities of demand. In the event of a rise in the price of tobacco, for example, borderline smokers will probably kick the habit right away, while die-hard adherents will only gradually reduce their consumption over the years. The proportion of young smokers entering the market will also decrease. The long-run impact of a rise in price on the change in consumption will, therefore, be higher than its immediate impact over a year. The longer it takes for the price of tobacco to work out its effect on consumption, the longer is the "adjustment lag" and the higher is the long-run elasticity relative to the short-run. Existing studies show that policy-makers have to wait two to three years for the major impact of higher tobacco prices to work itself through consumption.

Few studies estimate the impact of a rise in price on different cohort groups and on smuggling, or the differential impacts of price increases relative to price decreases, or the role of structural changes such as media campaigns. The scant evidence shows that: (1) smokers are more prone to increase their consumption of tobacco in response to a fall in price than they are to cut it down in the event of a price increase; (2) the impact of a higher tobacco price on teenagers is greater than on adults; (3) the percentage reduction in total consumption of tobacco is much smaller than in taxed goods, since some smokers may switch from legal to contraband in response to a tax hike.

When the federal government reduced taxes on tobacco in 1994, some provinces followed suit while others kept their taxes at the same level. The effects of these differing reductions in taxes and prices on cigarette sales are examined for each province using a simple model using data for the period, 1981 to 1995. Though firm conclusions cannot be drawn due to the short periodicity of data, the following interesting results were obtained:

1. Lag in the adjustment of desired consumption to its actual value is quite moderate, say, not more than a couple of years. This is an encouraging conclusion for formulating a policy to reduce the smoking habit through higher tobacco prices via higher taxes.

2. Price elasticities fall within the range of -0.5 to -0.6, supporting the evidence from the survey above that price elasticities are significantly below unity.

Estimated elasticities were used to forecast cigarette sales for the years 1994 and 1995, two years following the reduction in taxes and the introduction of TDRS. A comparison of estimated and observed sales showed the following:

Models generally overestimated consumption in 1994 and 1995 for provinces other than Alberta. The result could imply that media campaigns and a gradual tightening of spatial restrictions on smoking generally offset the impact of a decline in cigarette prices. Secondly, overestimation is higher in 1995 than in 1994 implying that the impact of anti-smoking initiatives had spread to a larger proportion of the population in 1995 relative to 1994, or that the message was more forcefully seeping into the peoples' psyche, inducing them to make drastic reductions in smoking.

It is suggested that there is a need for more relevant disaggregated data in order to get a better insight into the differential effects of price changes on the smoking behaviour of special cohort populations. Such a study could provide valuable input to the formulation of a realistic and effective anti-smoking policy.

CHAPTER ONE

INTRODUCTION

On February 8, 1994, the Federal Government formally launched a National Action Plan on Smuggling (NAPS). The Tobacco Demand Reduction Strategy (TDRS) was introduced, as part of NAPS, to counteract the increase in tobacco consumption that was expected to follow the reduction in tobacco taxes. An amount of $115 million had been allocated to the Strategy over three years ending in 1995-96. Health Canada was assigned the responsibility for the implementation and evaluation of the TDRS.

The evaluation of TDRS is currently underway. The evaluation study is being carried out in 3 parts. This report presents the results of the Part III of the evaluation study. The report comments on the usefulness of the results of three surveys released in 1996 for the TDRS evaluation; compares their results with earlier surveys (as appropriate); provides information (based on survey findings) on the changes in the prevalence of smoking, consumption of cigarettes, awareness and attitudes about the harms to health from smoking and exposure to external tobacco smoke (ETS); and comments on whether the changes in the indicators could be attributed to the TDRS. The report also includes the results of an examination of the relationship between provincial cigarette sales, cigarette prices
and real per capita personal disposable income.

Scope and Limitations of the Part III of Evaluation Study

The main objectives of the Part III of the evaluation study were to

1. determine, from survey data and results of media tracking studies, whether there is sufficient evidence that there has been changes (increases or decreases) in the following indicators as a result of the introduction of the TDRS, and further, if these changes are statistically significant:

    a) smoking consumption and prevalence among the TDRS target groups,
    b) awareness/knowledge of the dangers of smoking and of ETS, particularly among TDRS target groups,
    c) public attitude toward tobacco smoking in general,
    d) changes in smoking policies in schools, health facilities, daycare centres, restaurants and other places accessible to the public, and
    e) changes in exposure to ETS in the home, the workplace and public areas;

2. determine whether, in light of the trends observed in smoking prevalence and amount smoked since the introduction of the TDRS, there is any evidence that the 1994 reduction in price had effect on tobacco consumption, particularly among Youth; and

3. determine whether the difference (if any) in smoking prevalence and consumption between provinces can be attributed to price differences.

See Appendix A for a detailed list of the objectives of the Part III of the evaluation study.

The objectives of the part III of the study are derived from the following evaluation questions and sub-questions developed by the Evaluation Framework[3] for the Tobacco Demand Reduction Strategy (question numbers refer to the evaluation questions presented in the Framework Report - (See Appendix B for a full list of evaluation questions):

1.0 Has the situation (social context) that existed at the introduction of the TDRS changed and in what way?

The answer to this question will provide the overall context which will be assessed on the basis of the following indicators:

1.1 trends in prevalence and amount of tobacco use in the population in general and, more particularly, among the TDRS specific target groups.

1.2 changes in provincial anti-tobacco legislation (not covered by Part III of the evaluation study) and municipal by-laws that protect non-smokers from ETS.

1.3 changes in awareness/knowledge of the dangers of tobacco smoking and of ETS among the general public and, more specifically, among the TDRS specific target groups.

1.4 changes in public attitude toward tobacco smoking in general.

1.6 changes in smoking policies in schools, health facilities, daycare centers, restaurants and other places accessible to the public.

1.7 changes in exposure to ETS in the home, the workplace and public places.

2.0 In light of trends observed in smoking prevalence and amount smoked since the introduction of the TDRS, is there any evidence to support the basic assumption behind the TDRS, i.e., that a decrease in price leads to an increase in consumption?

2.1 To what extent did changes in price contribute to a change in smoking prevalence and consumption, particularly among young Canadians?

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[3] Tobacco Demand Reduction Strategy, Evaluation Framework, (May 1995)

2.2 Can the difference in smoking prevalence and consumption among provinces be attributed to price differences?

17.0 What has been the impact of media campaigns on target groups in terms of increased awareness, knowledge of the dangers of tobacco smoking and of ETS? What evidence is there of changing attitudes and behaviour?

The analysis carried out for this report was solely based on documents provided by Health Canada. No additional data were collected and no additional analysis, of raw survey data was carried out. These limitations may affect the conclusions presented in this report.

The Tobacco Demand Reduction Strategy (TDRS)

The ultimate aim of the TDRS is to minimize the anticipated negative impact of tax cuts on tobacco consumption, particularly in those groups most likely to initiate or increase tobacco use as a result of lower prices. In particular, the objectives of the TDRS include,

minimizing the risk of an increase in tobacco consumption in those groups most likely to initiate or increase tobacco consumption because of lower prices, and

increasing the priority of tobacco control as a public health measure in Canada.

In addition, it is anticipated that the TDRS will:

- *increase public knowledge of the dangers associated with tobacco product use;*
- *enhance public awareness of the health risks associated with environmental tobacco smoke; and*
- *further demoralize the use and marketing of tobacco products.*

TDRS has been developed in a manner consistent with the goals of the National Strategy which are:

- to help non-smokers stay smoke-free;
- to encourage and help those who want to quit smoking to do so;
- to protect the health and rights of non-smokers.

The TDRS Target Groups

Youth, women, priority groups and public are four target groups identified under TDRS.

1. Youth

This group is considered to be the most sensitive to the price of tobacco. It is believed that a reduction in price may encourage youth to either take up smoking or smoke more. Furthermore, it is within this age group that most people who become long term smokers start to smoke. Most components of TDRS have youth among their target groups.

2. Women

Smoking among women has been declining less rapidly than among men and more teenage girls smoke than boys. TDRS will particularly target teenage girls, low-income women, unemployed women, aboriginal women, single mothers and women with low literacy skills. These have been identified as high risk groups in Synthesis of the Literature on Priority Groups for Smoking Protection, Prevention and Cessation Programs, Diane Kinnon and Liz Hart, October 1994.

In addition, TDRS will include a pre- and post-natal initiative specifically aimed at women of child-bearing age.

3. Priority Groups

These groups include immigrant youth, people with low income, itinerants, people with low literacy skills and aboriginal people. There continues to be high levels of smoking among these groups, they are hard to reach and they appear to have benefited least from past efforts to reduce tobacco consumption.

4. The Public

TDRS also aims at informing and influencing, directly or indirectly, public attitude and behaviour concerning tobacco smoking.

TDRS involves a number of specific programs aimed at increasing the awareness of the negative health effects of smoking and of the external tobacco smoke, discouraging non-smokers from taking up smoking, and encouraging smokers to stop.

Surveys Relevant to TDRS Evaluation

In preparation for the evaluation, the Strategic Planning and Program Evaluation Division, Policy and Consultation Branch, Health Canada developed an evaluation framework for the TDRS.[4] The framework describes the objectives, target groups, means of intervention and expected results of the TDRS; states the questions which will be addressed in the evaluation; discusses the evaluation approach and methodology; and identifies potential information sources.

Surveys Released Before 1996

The Framework identified the following ten surveys as potentially useful in the evaluation of the TDRS:

1. Survey on Smoking in Canada (SOSIC),
2. Media Campaign Monitoring and Tracking Studies (Sage 1995),
3. Health Monitoring Study (Tandemar Research Inc.),
4. Youth Smoking Survey (YSS),
5. Canada's Alcohol and Other Drugs Survey (CADS),
6. Canada's Health Promotion Survey (CHPS),
7. National Population Health Survey (NPHS),
8. Canada Health Monitor (CHM),
9. Study on Youth Smoking (SYS-Ont.), and
10. National Longitudinal Survey of Children and Youth (NLSCY).

A 1996 report by Madhu Joshi and Associates[5] reviewed documents from the surveys listed above (with the exception of NLSCY) to determine their relevance and usefulness for the evaluation of TDRS. Results from NLSCY were not available at that time.

National Surveys and Information Released in 1996

In 1996, results from three more national surveys related to smoking were released. These included:

1. National Longitudinal Survey of Children and Youth (NLSCY),

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[4] Tobacco Demand Reduction Strategy, Evaluation Framework, (May 1995)

[5] Surveys on Smoking and Tobacco Demand Reduction Strategy Evaluation; Madhu Joshi & Associates (March 1996)

2. Surveys related to the Anti-Smoking Tracking Study carried out by the Sage Research Corporation (Sage 1996), and

3. 1995 Survey of Municipalities Related to Smoking By-laws in Canada

A more detailed technical report on the analysis of the Youth Smoking Survey was also released in 1996.

Other Surveys and Information Available for Analysis

In addition to these surveys, information and/or reports based on the following surveys were available for analysis.

4. Ontario Alcohol and Other Drug Opinion Surveys, and
5. National Survey of Programs on the Prevention of Tobacco Use in Schools (1992-1993),
6. Non-Smoking Policies in Schools and School Boards: A National Survey (1990),
7. A National Survey of Schools (1995), and
8. Surveys Related to the Public and Commercial Settings.

Annual data on provincial cigarette sales, "real" per capita personal disposable income, price indices for cigarettes and populations were obtained from Health Canada and Statistics Canada (CANSIM).

Chapter three presents the results of an analysis of information from surveys and from other reports. Chapter four presents the analysis of the relationship between provincial cigarette sales, cigarette prices and personal disposable income.

CHAPTER TWO

RELEVANCE AND USEFULNESS OF INFORMATION USED

Surveys Released Before 1996

Results from the following ten surveys were released before 1996:

1. Survey on Smoking in Canada (SOSIC),
2. Media Campaign Monitoring and Tracking Studies (Sage 1995),
3. Health Monitoring Study (Tandemar Research Inc.).
4. Youth Smoking Survey (YSS),
5. Canada's Alcohol and Other Drugs Survey (CADS),
6. Canada's Health Promotion Survey (CHPS),
7. National Population Health Survey (NPHS),
8. Canada Health Monitor (CHM),
9. Study on Youth Smoking (SYS-Ont.), and
10. National Longitudinal Survey of Children and Youth (NLSCY).

A review of these surveys conducted by Madhu Joshi and Associates[6] in 1996 indicated that:

SOSIC, Sage, Tandemar and YSS surveys were specially commissioned in conjunction with the Tobacco Demand Reduction Strategy. These surveys were designed to collect information on awareness of health risks from smoking and external smoke, attitudes towards smoking, smoking behaviour and change in smoking behaviour after cigarette prices dropped following a reduction in tobacco taxes. In addition, Sage and Tandemar surveys were designed to assess the extent to which TDRS media campaigns reached the intended target population.

These four surveys will provide a wealth of information for modifying existing and designing new anti-smoking programs. However, they have a limited use in evaluating the effectiveness (incremental effects) of TDRS in increasing awareness of dangers from smoking, making smoking socially less acceptable and influencing smoking behaviour of Canadians. This is because of the existence of myriad other anti-smoking programs, absence of comparable baseline data and the timing of the surveys in relation to the media campaigns.

CADS, CHPS and NPHS are Statistics Canada surveys which have a few questions on smoking. However, these surveys have large national samples which provide comparable and reliable estimates of the prevalence of smoking over the last 30 years. They can provide data for regions as well as for specific sub-populations (e.g., males 15 to 19). However, these

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[6] Surveys on Smoking and Tobacco Demand Reduction Strategy Evaluation; Madhu Joshi & Associates (March 1996)

surveys collect information from persons 15 and over. They do not provide any information about youths aged 12 to 15. This sub-population is considered to be at a high risk for smoking. These surveys also exclude persons living on army bases or in institutions (prisons, hospitals, etc.), and residents of NorthWest Territories and Yukon. The surveys use a Random Digit Dialling method for collecting information through a telephone interview. This method has a high probability of excluding people with no telephones (e.g., homeless, street kids, etc.). CADS, CHPS and NPHS provide only a limited information about smoking, consisting mostly about the smoking habits of respondent groups.

Canada Health Monitor is an ongoing cyclical private sector survey which includes questions on health and smoking. The methodology and question wording for all cycles of CHM surveys has remained constant. It can, therefore, provide comparable smoking prevalence data over time (trend data). However, CHM does not have a large enough sample to provide reliable estimates for smaller populations (e.g., pregnant women, etc.). The CHM also collects information from persons 15 and over.

Study of Smoking in Ontario (SYS-Ont) focuses on the perception of grade seven and nine student in Ontario about plain packaging of cigarettes and related issues.

Some times combining results of many sample surveys provide more reliable estimates. However, the target population, sampling and survey methodology, and time frame of the surveys have to be comparable. Most of the nine surveys reviewed have been conducted in different time frames. There does not seem to be any advantage, at least for the purpose of TDRS evaluation, in combining results from different surveys.

None of these surveys provide reliable and prospective information to determine the effect of price changes on the smoking behaviour. The Sage surveys provide some information on the changes in smoking behaviour after the drop in cigarette prices. However, the data do not show any clear trends. While 20% teens said that they were smoking more since the price drop, 18% told that they were smoking less. Five percent adults were smoking more since the price drop while 15 percent were smoking less.

Surveys Released in 1996

Results from the following surveys were released in 1996:

1. National Longitudinal Survey of Children and Youth (NLSCY),
2. Surveys related to the Anti-Smoking Tracking Study carried out by the Sage Research Corporation (Sage 1996),
3. The 1995 Survey of Municipalities Related to Smoking By-laws in Canada, and

1. National Longitudinal Survey of Children and Youth (NLSCY)

NLSCY is a long term survey designed to measure child development and well being. It is being conducted by Statistics Canada on behalf of Human Resources Development Canada. Data will be collected every two years from the same panel of children.

The cycle 1 of the NLSCY included children from 0 years (newborn) to 11 years of age. The long term goal of NLSCY is to follow and monitor these children into adulthood. The cycle 1 of the NLSCY used a complex sampling scheme based on the Labour Force Survey (LFS) Frame. The NLSCY also included a Territories component in addition to the LFS based sample. During the same period, Statistics Canada was also launching another longitudinal survey "National Population Health Survey (NPHS)" using the LFS Frame. Portions of the two surveys (NLSCY and NPHS) were integrated in ten provinces so that children selected in NPHS became part of the NLSCY sample.

The data for the NLSCY (including the NPHS part) were collected between November 1994 and March 1995. The survey sample included 15,579 households. Information was obtained on a total of 22,831 children from 13,439 households.

Table 2.1 on the next page gives the distribution of the children in the sample by their age.

Table 2.1

Age Distribution of the NLSCY Sample.

Age in Years	No. In the Sample
0	2,227
1	2, 469
2	1,963
3	1,946
4	1,935
5	1,793
6	1,800
7	1,750
8	1,780
9	1,734
10	1,766
11	1,688
Total Sample	22,831

The cycle 1 includes only 1,688 children above ten years of age from ten provinces and territories. The focus of the NLSCY was not smoking. There was no information from this survey which was relevant to the evaluation of TDRS.

2. Surveys related to the Anti-Smoking Tracking Study carried out by the Sage Research Corporation (Sage 1996)

Health Canada commissioned the Sage Research Corporation to conduct a tracking study pertaining to Health Canada's 1995/96 public awareness campaign related to the TDRS. The main objectives of the tracking study included the measurement of attitudes and beliefs about smoking, and the impact of media campaigns on the smoking related knowledge, attitudes and behaviour. The methodology and questionnaires of the tracking study were similar to those used in the earlier tracking study carried out in relation to the 1994/95 media campaign. Results from the two tracking studies provide excellent information on the changes in smoking related beliefs, attitudes and behaviour from 1994 to 1995.

The samples sizes of the tracking studies were not as large as those used in Statistics Canada surveys. However, they were large enough to provide useful information for the evaluation. Samples for the tracking studies were designed to provide comparable estimates for Quebec and rest of Canada separately.

As in the earlier tracking study, the 1996 Sage survey included persons 11 years and over. This survey also provides valuable information on beliefs, attitudes, knowledge and behaviour of youth, a target group of the TDRS.

For the purpose of this report, the surveys related to the 1994/95 campaigns are referred to as Sage 1; and those related to the 1995/96 campaigns as Sage 2.

Information for Sage 2 surveys was collected using telephone interviews of Canadians 11 years and over. The interviews were conducted between March 4, 1996 and April 4, 1996. Sage 2 yielded a total sample of 2,158 adults (18 and over) and 1,002 teens (11 to 18). The distributions of the samples for Sage 1 and Sage 2 are presented in Table 2.2 below.

Table 2.2

Distributions of Samples by Age and Provincial Groups

Provincial Group	Adults		Teens	
	Sage 2 (1996)	Sage 1 (1995)	Sage 2 (1996)	Sage 1 (1995)
English Canada	1526	2142	652	619
Quebec	632	764	350	297
Total	2158	2906	1002	916

Results from Sage 2 and comparisons between Sage 1 and Sage 2 are provided in later sections.

3. Surveys on Smoking By-laws in Canada (1991 and 1995)

In 1984, Calgary Health Services carried out a survey of Canadian Census Metropolitan Areas to determine centres (municipalities) with smoking legislation. The database developed from that survey was updated until 1988. In 1991, Health Canada (HC) took over the project and began to updated the database through surveys in 191 and 1995. The 1995 survey was carried out by Optima Consultants on behalf of Health Canada.

The 1995 survey was designed to obtain information from all the municipalities in provinces and territories with populations over 10,000. Additionally in provinces with less than 75% of the population covered by municipalities with 10,000 population, the sample included municipalities with population under 10,000. The goal was to cover 1) all municipalities with population over 10,000 and 2) include a sufficient number of municipalities to cover 75%

(60% in provinces with large rural populations) of the population of the province or the territory. The total sample included 698 municipalities (350 with populations 10,000 and over, 193 with populations between 2,000 and 10,000 and, 155 municipalities with populations under 2,000).

The municipalities in the sample were asked to complete a small questionnaire on by-laws and were requested to send copies of their by-laws for analysis. Thirty of the 698 questionnaires mailed did not reach the recipients and 367 municipalities had no smoking related by-laws or policies. Three hundred and one municipalities were considered to have smoking related by-laws or policies. Of these, 269 provided sufficient information for analysis.

The survey information is presented more like an inventory of smoking by-laws rather than tabulations. Also, the main table includes 66 municipalities which were not included in the 1995 survey but were included in the 1991 survey and had reported to have smoking related by-laws. Most of the tables include lists of municipalities with information on specific by-laws. The lists are not sorted by province, making it impossible to tabulate information by provinces. Nonetheless, these surveys are useful in examiming pre- and post- TDRS changes to the number of municipalities with by-laws restricting smoking in various settings under their jurisdictions.

Other and Information Available for Analysis

In addition to the above surveys, reports from the following surveys were also available for analysis.

4. Ontario Alcohol and Other Drug Opinion Surveys (OADOS)

Ontario Alcohol and Other Drug Opinion Surveys were conducted annually from 1992 to 1995 by the Addiction Research Foundation. The sample size for the 1992, 1993 and 1995 surveys was 1000 and for the 1994 survey, 2000. A two-stage sampling procedure was used, the first stage to select households using a random digit dialling method and the second stage to select an adult respondent from the selected household. Telephone interviews were conducted to collect data. Response rates for the surveys were about 65%.

OADOS were not primarily designed to monitor Ontario Drug Strategy. They collected information on the use of and opinions about alcohol and other drugs (including tobacco). OADOS are now replaced by a series of small annual surveys titled Ontario Drug Monitor.

OADOS provides information for Ontario residents only and are much smaller in size than Ontario component of Statistic Canada surveys. Information from OADOS may be useful in confirming trends observed in other surveys, but is not essential for the evaluation of TDRS.

5. Non-Smoking Policies in Schools and School Boards: A National Survey (1990)

A national mail survey was conducted by the Decima Research to collect information on non-smoking policies in schools and school boards. The sampling frame included 14460 schools and 736 school boards. Table 2.3 below shows the distributions of the number of schools and school boards in the sampling frame according to whether they were included in the sample and further, whether they responded to the survey or not.

Table 2.3

Distribution of the Number of Schools and School Boards in the Sampling Frame
National Survey (1990)

Province	Schools In the Frame	Schools Sampled	Schools Responded	Boards In the Frame	Boards Sampled	Boards Responded
Canada	14400	9804	6572	736	736	536
B.C.	1488	1488	999	75	75	57
Alberta	1763	1763	1225	180	180	131
Sask	941	941	616	106	106	68
Manitoba	868	868	542	66	66	41
Ontario	4718	2367	1760	189	189	149
Quebec (*)	2549	264	193	20	20	18
N.B.	424	424	336	42	42	31
N.S.	566	566	383	21	21	16
P.E.I.	72	72	46	5	4	5
N.F.	673	673	374	32	32	21
Federal/Band	378	378	98	---	---	---

This survey can be used as the base line information on non-smoking policies in schools.

6. National Survey of Programs on the Prevention of Tobacco Use in Schools (1992-1993).

In 1992-93, Health Canada and the Canadian Cancer Society jointly conducted a study to identify programs for the prevention tobacco use (smoking) in Canadian schools. A survey of school boards and schools was undertaken to obtain information on such programs. A two-stage stratified sampling procedure was used to select school boards and then schools for the survey. The sampling procedure was designed to ensure that large as well as small school

boards were properly represented in the survey. The total number of schools were 13,620. Of these, a total of 342 schools from 118 school boards were selected for the survey. Representatives of 118 school boards and 306 schools were interviewed. Of the 306 schools, written responses were received from 227. Data collection took place from September 1992 to March 1993.

The survey was conducted before the introduction of the TDRS. Information from this survey has limited use for the evaluation of the TDRS. The survey provides information on the restrictions on smoking in schools to augment information on municipal by-laws.

7. A National Survey of Schools (1995)

A national survey of approximately 4175 schools was conducted early in 1995 as part of a larger study commissioned by TDRS on smoking policies in a public settings. The survey included 3,014 elementary schools and 1,160 secondary schools. No breakdown of the sample by province was provided in the summary document. This survey was smaller than the 1990 Decima Research Survey, however the survey findings are "considered to be reasonable reliable".

This survey provides post-TDRS information on non-smoking policies in schools across Canada

8. Smoking Policies in the public and Commercial Settings

In 1995, as part of a larger national study on smoking policies in a number of public settings the following surveys were undertaken:

a. a telephone interview survey of 100 large Canadian companies covering the four sector of retailing, food services and hotels, commercial landlords and bus terminals,

b. a survey of 2,396 (approximately 56% of such facilities in Canada) hospitals, long term and chronic care facilities, and other residential care centres,

c. a survey of about 2,554 (approximately 30% of such centres in Canada) licensed daycare centers, and
d. interviews of 198 daycare agencies for voluntarily licensed private home day-care.

Summary reports for these surveys were also available for analysis.

CHAPTER THREE

FINDINGS AND CONCLUSIONS

Evaluation Indicators and Sources of Information

Evaluation Indicators

The main objective of the Tobacco Demand Reduction Strategy was to counteract the possible effects of the reduction in tobacco prices (following reduction in taxes on tobacco) on the smoking behaviour of Canadians. It was expected that the number of smokers and the amount of cigarettes smoked would increase due to the reduction in tobacco taxes. Therefore, TDRS was designed to discourage non-smokers from taking up smoking; encourage smokers to stop smoking or reduce the amount smoked; reduce the exposure of Canadians to ETS; increase the awareness about the ill-effects of smoking; and influence the beliefs, attitudes and knowledge of Canadians, particularly, in target groups. In short, the aim of the TDRS was to influence and change the smoking behaviour of Canadians.

The principal indicators for the measurement of the current smoking behaviour and changes in it are the prevalence of smoking and the quantity smoked. The prevalence of smoking is generally measured as the percentage of individuals in the population or the population sub-group who smoke at the time of the measurement or in a specified reference period. The amount smoked is usually reported as the average number of cigarettes smoked by smokers either per day, or per year.

The measurement of knowledge, attitudes and beliefs is more complicated. In particular, the measurement of the level of knowledge possessed or the strength of attitudes and beliefs requires sophisticated information and analytical tools. The indicators range from simple distribution of responses to binary or multiple choice questions, to composite indicators based on information obtained in surveys or in-depth interviews. Composite indicators may involve complex models such as factor analytical models.

The most relevant sources of information for compiling indicators of smoking related behaviour, knowledge, attitudes and beliefs are the individuals themselves. Sample surveys are generally used to collect such information.

Other indicators such as annual sales of cigarettes or tobacco products provide information on the society as a whole and can be used for macro-economic analysis. However, these indicators do not provide information on the smoking behaviour of individuals. These indicators can be used in developing national level policies but are not necessarily useful in developing policies to modify or change smoking behaviour of individuals in specific target groups.

Information Sources

Data from sample surveys were the main sources of information for the analysis of the prevalence of and changes to smoking behaviour, knowledge, attitudes and beliefs.

There were a number of national surveys which included some questions on smoking related behaviour, knowledge, beliefs and attitudes. Most of these surveys collected information from persons 15 years of age and over.

Statistics Canada has conducted a number of national surveys with some questions on the smoking behaviour of Canadians. Canada Health Monitor (CHM) also conducts regular national omnibus surveys to cover different topics of interest to their clients. These omnibus surveys always include a few basic questions on the smoking habits of respondents.

Surveys conducted by Statistics Canada (STC) provide more reliable estimates of the number of smokers and other characteristics. STC have sufficiently large sample sizes to provide comparable estimates at the provincial level and estimates for sub-populations (e.g., persons within a certain age groups or income groups) at the national level. Surveys conducted by other organizations usually have smaller samples.

The province of Ontario regularly conducts provincial surveys for collecting information on alcohol and other drug (including tobacco).

Recognizing the need for relevant and timely information for the measurement of the effectiveness of the TDRS, Health Canada commissioned a number of special surveys and studies (e.g., Media Tracking Study) involving surveys. The surveys commissioned by Health Canada specifically for TDRS include:

1. Survey of Smoking in Canada (SOSIC) conducted in four cycles,
2. The Youth Smoking Survey (YSS) collecting information from youth between the ages of 10 and 19,
3. Media Tracking Studies involving surveys to assess the effectiveness of 1994-95 and 1995-96 media campaigns. The studies were conducted by the Sage Research Corporation, and
4. Health Monitoring Study conducted by Tandemar Research Inc.

SOSIC and YSS were conducted by Statistics Canada on behalf of Health Canada. Surveys associated with Media Tracking and Health Monitoring studies are smaller in scale relative to Statistics Canada surveys, but they collect information on a time frame more suitable to observe immediate recalls of media campaigns and provide valuable information on the messages imparted by the campaigns.

In addition, information from a number of surveys on by-laws and policies on smoking was available.

Prevalence of Smoking

The definition of smokers varies from survey to survey. Many surveys ask several questions to classify the individuals according to whether they smoke every day, smoke occasionally, have stopped smoking or have never smoked. Some surveys (Sage) classify respondents on a continuum, from emphatic smokers to emphatic non-smokers, according to their future intentions re: smoking. This makes comparisons between surveys very difficult.

The Survey of Smoking in Canada (SOSIC) defines current smokers as those who presently smoke either daily or non-daily[7]. The youth Smoking Survey (YSS) defines current smokers as those who have smoked at least 100 cigarettes in their lifetime and have smoked during the last 30 days[8]. Sage surveys use a complex system of classifying individuals into seven groups according to their current smoking habit and intentions to change their smoking behaviour. Current smokers are those who have smoked at least 100 cigarettes in their lifetime and smoke now[9], a slight variation from the definition used in the YSS.

Table 3.1 on the next page shows smoking prevalence in Canada from 1965 to 1995. The table is based on national surveys conducted by Statistics Canada. Data from these survey are of comparable quality. Caution should be exercised in drawing statistical inferences about the differences in the smoking prevalence between age groups or in different years within the same age group.

Table 3.1 shows that the overall smoking prevalence has been steadily declining over the period 1981 to 1995 (with the exception of 1991). However, smoking among age-groups 25-64 and 65+ shows a different trend than among age-groups, 15-19 and 20-24. Smoking among persons 25 and over has seen a steady drop throughout the period 1981 to 1995 , while that among adults below 25 years of age has increased since 1991. Among females 15-19, the increase was 5% between 1990 and 1991 and 4% between 1991 and 1994. Among males 20-24, there was an increase of 9% percent between 1990 and 1991 and a decline of 4% between 1991 and 1994.

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[7] Survey on Smoking in Canada, Fact Sheet, Cycle 2, Health Canada, (November 1994).

[8] Youth Smoking Survey, Technical Report, Health Canada, (1994).

[9] Executive Summaries of Anti-Smoking Study, Sage Research Corporation (1995 ans 1996).

Table 3.1
Long Term Trends table

Smoking Prevalence in Canada
(1965 - 1995)

Year	1965	1970	1974	1975	1977	1978	1979	1981	1983	1985	1986	1988	1989	1990	1991	1994	1995
Males	61	55	52	51	48	44	45	44	41	36	35	32	33	31	32	31	29
Females	38	38	39	38	38	37	37	35	34	32	31	25	29	28	30	29	26
Age 15-19																	
Males	55	56	54	51	49	36	47	45	38	28	24	20	21	21	20	27	25
Females	37	43	48	48	47	40	46	42	39	29	28	23	22	21	26	30	26
Age 20-24																	
Males	69	61	59	56	53	52	49	48	44	40	38	33	36	35	44	40	37
Females	50	52	50	49	51	50	40	50	48	41	39	40	38	34	36	37	31
Age 25-44																	
Males	69	61	56	55	53	48	46	48	44	41	39	41	37	36	38	36	33
Females	48	45	43	43	42	41	42	38	40	39	36	31	34	34	34	32	30
Age 45-64																	
Males	67	59	55	56	50	44	43	46	41	36	36	32	34	30	30	28	29
Females	36	36	36	38	36	34	34	33	32	30	29	34	30	26	31	29	23
Age 65+																	
Males	42	40	37	39	33	32	25	27	27	20	20	29	21	18	18	17	15
Females	12	11	14	14	15	15	13	14	15	18	14	14	16	14	15	15	14

Source: Statistics Canada, Canada's Health Promotion Survey 1990, Technical Report Table 7-5, Page 101; and Surveys on Smoking in Canada

All age groups (with the exception of males 45 -64 years) have seen a decline in the prevalence of smoking between 1994 and 1995, the two years when TDRS and other anti-smoking campaigns were in high gear.

Long-term trend data from 1965 show similar anomalies in the smoking behaviour in different age-groups. While the overall prevalence of smoking was steadily declining from 1965 to 1981, there was a significant increase in smoking between 1978 and 1981 among males and females within the age-group 15-19. However, after 1981 the smoking prevalence among males and females (15-19) returned to pre-1978 level and continued downward trend. The smoking prevalence among females 20-24 sharply declined from 50% to 40% between 1978 and 1979 but increased back to 50% by 1981 and then continued downward trend after that. See Appendix C for charts showing long term trends in smoking rates for different age groups.

Table 3.2 below shows the percentage of smokers among 10-14 and 15-19 year old teens according to the 1994 Youth Smoking Survey. and SOSIC Cycle 2.

Table 3.2

Prevalence of Smoking Among Teens
(Percent Smokers by Age and Sex Groups)

Data Collection Period	Youth 10-14 YSS (Sept - Dec 1994)	Youth 15-19 YSS (Sept 1994)	Youth 15-19 SOSIC Cycle 2 (Aug - Sept 1994)
Both Sexes	7	24	29
Males	7	23	27
Females	7	24	30

The estimate of smoking prevalence among Youth 15-19 from YSS is much lower than that from SOSIC Cycle 2. Both these surveys were carried out at about the same time. YSS had 9,500 respondents while SOSIC Cycle 2 had 13,400 respondents. The difference in the prevalence rates may be due to differences in the definition of smokers,

Sage Research Corporation's two surveys also provide estimates of smoking prevalence during 1995 ans 1996. Table 3.3 on the next page shows smoking prevalence for adults and teens for the two Sage surveys.

Table 3.3

Percentage Distribution of Respondents According Smoking Status

	Adults		Teens	
	Sage 2 (1996)	Sage1 (1995)	Sage 2 (1996)	Sage1 (1995)
Smokers	32	26	11	8
Former Smokers	27	31	3	4
Non-Smokers	41	43	85	87

According to the Sage surveys, the number of adult smokers increased by 6% from 1996 to 1996, and teen smokers by 3%. A four percent decrease in adult former-smokers from 1995 to 1996 suggests that many have restarted smoking between 1995 and 1996. It is not possible to determine, from the information available for the study, whether these differences are statistically significant or not.

Sage1 surveys were conducted after the SOSIC Cycle 4 (February - March 1995). According to the SOSIC cycle 4, the prevalence of smoking among individuals 15-19 was 26%. The age grouping for SOSIC and Sage surveys are different. It is not possible to determine from the available information whether and to what extent the estimates of smoking prevalence from Sage 1 surveys are less than those reported by SOSIC cycle 4.

The 1995 Ontario Alcohol and Other Drug Opinion Survey OADOS) collected information on the smoking behaviour of Ontario Adults (18 and over). The sample size for OADOS was 994. The survey was conducted from March 28 to May 9, 1995. The survey estimated smoking prevalence among Ontario males to be 30% and among females to be 27%. These estimates are comparable to 1995 smoking prevalence from SOSIC Cycle 4, which was conducted just before OADOS.

The Sage 2 surveys show that the prevalence of smoking has increased between 1995 and 1996. It appears that the prevalence has returned to its pre-1994 level (as found by SOSIC Cycle 1). The real question is not whether these changes are statistically significant or not, but whether the reduction in smoking between 1994 and 1995 was caused by mass media campaigns related to TDRS and other external initiatives and the impact of which has now diminished.

In summary, Smoking prevalence in Canada has been declining over a long period of time since 1965. There was a sharp increase in smoking between 1978 and 1979 among young adults (15-19) ; and between 1990 and 1991 among males (20-24). Overall smoking

prevalence had also slightly increased between 1990 and 1991. During this period, taxes and prices of legally sold cigarettes were increasing and the sale of smuggled cigarettes with lower prices was also increasing.

Despite the reduction in tobacco taxes in 1994 and an expected increase in smoking prevalence in response to lower cigarette prices, smoking prevalence has declined between 1994 and 1995. While it may not be possible to attribute this decline to TDRS, it could be due to a combination of all anti-smoking campaigns, restrictions on smoking in public places, anti-tobacco regulations, and advice provided by public health and medical professionals.

Amount Smoked

Another indicator of the success of anti-tobacco campaigns is the decrease in the average number of cigarettes smoked. A limited number of surveys have collected this information. Reporting of information on the amount smoked also varied from survey to survey, making comparison of smoking over time complicated.

Among the surveys reviewed, the General Social Survey (1991), four cycles of SOSIC (April 1994 to March 1995), Sage surveys (1995 & 1996), Youth Smoking Survey (1994) and Tandemar Research Inc. survey (1994) asked questions on the amount smoked. Tandemar survey was not used in this analysis because of its smaller sample size and the availability of same information from larger surveys.

SOSIC cycles 1 to 4 asked the same question on amount smoked to its panel of respondents. Youth Smoking Survey also asked respondents questions on the amount smoked. Sage surveys specifically linked quantities smoked to the reduction in prices.

Table 3.4 on the next page below shows estimates of the number of cigarettes smoked by males and females according to the 1991 General Social Survey (GSS).

Table 3.4

Percent of Respondents According to the Number of Cigarettes Smoked Daily
1991 General Social Survey (GSS)

Number of Cigarettes Consumed daily	1-10	11-25	26+
Both Sexes	22	68	10
Males	19	68	13
Females	25	67	7

Source: Report on Women and smoking (1993), Health Canada

The table shows that about the same percentage of men and women smoked between 11 and 15 cigarettes. Where men and women differ is that 6% more men smoked more than 26 cigarettes per day, while 6% more women smoked between 1 and 10 cigarettes per day. The report concluded that "on average female smokers consume fewer cigarettes than male smokers".

It is not possible to calculate the average number of cigarettes smoked by men and women from this table. However, it may be possible to obtain a range for the difference in the average number of cigarettes smoked by men and women under certain assumptions. If one assumes that (a) persons smoking 1-10 cigarettes daily, smoked on average 5-6 cigarettes daily; (b) those smoking 11-25 cigarettes daily, smoked on average 18-20 cigarettes daily; and (c) those smoking over 26 cigarettes daily, smoked on average 30 cigarettes daily, the estimates of the number of cigarettes smoked daily by men would be between 17.1 to 18.6, and by women between 15.4 ans 17.0. With these assumptions, the difference in the number of cigarettes smoked daily by men and women would range between 0.1 and 3.2 cigarettes per day, not a sizable difference.

According to the SOSIC, the average number cigarettes smoked daily ranged between 19.6 to 20.6 for men and between 15.6 and 16.9 for women. These estimates are slightly higher than those calculated (with certain assumptions) for men from the 1991 GSS and about the same for women. The slight differences between the two surveys could be due to the differences in time reference periods; GSS was conducted in 1991 and SOSIC in 1994-95. Table 3.5 on the next page shows average number of cigarettes smoked by daily smokers.

Table 3.5

Average Number of Cigarettes Smoked by Daily Smokers
Based of Four Cycles of SOSIC Surveys

Survey Period	Cycle 1 Apr-Jun 94	Cycle 2 Aug-Sep 94	Cycle 3 Nov-Dec 94	Cycle 4 Feb-Mar 95
Total Population	18.8	18.7	18.4	17.7
Males	20.6	20.5	20.0	19.6
Females	16.9	16.8	16.8	15.6
Age 15-19	13.2	12.7	12.2	11.4
Age 20-24	16.5	16.2	15.4	14.9
Age 25-44	19.7*	18.6	19.5*	18.0
Age 45-64		22.4		20.5
Age 65+	17.4	17.2	16.0	15.6

* Data are combined for age group 25-64.

The data from table 3.5 also show that men smoked more cigarettes per day than women, and the number of cigarettes smoked daily increased with age till 64 and then dropped thereafter.

YSS found that the mean number of cigarettes smoked by 10-14 year olds was 6.7 and by 15-19 year olds, 11.7. SOSIC cycle 2 reports a slightly higher estimate of 12.7 cigarettes per day for 15-19 year Olds.

Sage surveys asked whether the respondents smoked more or less after the drop in cigarette prices, but did not ask the number of cigarettes smoked before and after the price drop. Information from the Sage surveys is analysed in the next section on the effect of price reduction on the amount smoked.

Data from the General Social Survey (1991) and four cycles of SOSIC surveys (1994 -1995) support the conclusion that the average number of cigarettes smoked by men has increased during this period and that smoked by women has remained about the same. No intermediate comparable data was available to determine whether the increase was due to a reduction in prices in 1994.

Effects of Price Reduction on Smoking Habits

Sage surveys asked smokers about how the reduction in prices had affected the amount of their smoking. Table 3.6 below shows changes in smoking habits reported by smokers in Sage surveys.

Table 3.6
Effects of Price Reduction on Smoking Habit of Smokers

	Adults		Teens	
	Sage 2 (1996) (%)	Sage1 (1995) (%)	Sage 2 (1996) (%)	Sage1 (1995) (%)
Effects of the reduction in cigarette prices on smokers				
- smoke more	6	5	27	20
- Smoke about the same	76	80	57	61
- Smoke less	18	15	16	13

According to these surveys, only 5 to 6 percent of the adult (18+) smokers are smoking more after the price reduction and 15 to 18 percent are smoking less. On the other hand, 20% of teens smokers reported in 1995 and 27 % in 1996 that they are smoking more. While 18 and 16 percent of teens reported that they were smoking less.

These data are consistent with the possibility that the short term price elasticity of demand for cigarettes is less among adults than in teens. Adults have sufficiently large income available to them for cigarettes and have attained a level of smoking to satisfy their needs; small changes in cigarettes prices do not affect their smoking habit significantly. However, teens have comparatively less income available for cigarettes and the amount smoked by teens is still in on the increase. As a result, changes in cigarettes prices are more likely to affect cigarette consumption by teens.

There are no comparable pre- and post- TDRS data on the number of cigarettes smoked per day by smokers. Therefore, it would not be possible to attribute any changes directly to TDRS or to changes in prices. However, the data from Sage surveys show that a few adults are smoking more as a result of the reduction in prices but three times as many adults are smoking less. On the other hand, more teens have reported that they are smoking more as a result of the reduction in prices and a smaller number - same percent as adults - are smoking less.

Smoking Related Beliefs, Attitudes and Knowledge

Sage Research Corporation's Anti-Smoking Tracking studies (Sage 1 and Sage 2) provide information on changes in smoking related beliefs, attitudes and knowledge. Tandemar study provides useful information on "recalls" of Health Canada and other anti-smoking media campaigns. Information from these surveys is mainly used in an examination of changes in these indicators.

Sage surveys include a large number of questions on beliefs, attitudes and knowledge of respondents. Answers to only a selected number of these questions are discussed here. These include reactions of the respondents to the media campaigns, their beliefs on the addictiveness and harmfulness of tobacco, and their attitudes towards banning sponsorship of sport events by tobacco manufacturers and toward a total ban on the manufacture and sale of tobacco products.

The sample sizes of the Sage surveys are small for analysing data by sub-groups of respondents or by provinces (with the exception of separate analysis of Quebec and rest of English Canada). Sage reports also do not provide quantitative measures of reliability of survey data.

Table 3.7 below and continuing on the next page presents data from the two cycles of the Sage surveys.

Table 3.7

Percentage Distribution of Respondents According to
Smoking Related Beliefs, Attitudes, knowledge and Behaviour

	Adults		Teens	
	Sage 2 (1996) (%)	Sage1 (1995) (%)	Sage 2 (1996) (%)	Sage1 (1995) (%)
Ads clearly bring out the issue of the harmfulness of tobacco	90	92	91	89
Ads clearly get across the message to respect the health of non-smokers	90	89	91	86
ETS is harmful to babies and children	85	88	87	90

.... continued on the next page

Table 3.7 (Continued)

Percentage Distribution of Respondents According to Smoking Related Beliefs, Attitudes, knowledge and Behaviour

	Adults		Teens	
	Sage 2 (1996) (%)	Sage1 (1995) (%)	Sage 2 (1996) (%)	Sage1 (1995) (%)
ETS can cause lung cancer	63	66	73	73
Pregnant women should not smoke	93	92	95	92
Sponsorship of sporting or cultural events by tobacco companies should be banned	38	48	49	50
By the year 2000, the production and sale of tobacco should be banned	33	37	47	51
Tobacco is not as addictive as other drugs such as heroin & Cocain	16	16	25	20
Too much fuss is made about dangers of smoking	16	15	18	17
Smoking helps people relax	22	21	10	8
Overall effects of the reduction of cigarette prices on smoking				
- People smoke more	33	38	59	62
- Smoke about the same	51	49	34	32
- Smoke less	10	8	5	4

Both surveys found that a very high percentage of adults and teens were aware of the adverse health effects of tobacco and of the effects of ETS on babies and children. Similarly, a very high percentage of respondents felt that the Health Canada Ads clearly got the message out with respect to the health of smokers.

The table also shows that there have not been significant shifts in the beliefs and attitudes related to smoking from 1995 to 1996. These little or no shifts can also be seen in beliefs that smoking is not as dangerous or that smoking helps people relax.

Less than half of the respondents supported the ban on sponsorships of sporting and cultural events by the tobacco industry. Similarly, half the respondents supported banning the manufacture and sale of tobacco. However, the support for banning sponsorships has declined by 10% from 1995 to 1996 and for banning production and sale of tobacco by four percent over the same period.

The Ontario Alcohol and Other Drug Opinion Survey (OADOS) of 1995 asked respondents 18 years and over about their opinion on banning sponsorship of sporting and cultural events by cigarette companies. Fifty-three percent of respondents agreed that the government should ban such sponsorships. There was a significant difference between responses provided by males (46%) and females (60%) as well as between non-smokers (66%), former smokers (56%) and current smokers (36%).

The Sage 2 (1996) survey summarizes the opinions of smokers and non-smokers about the sponsorship, banning tobacco manufacture and sales, and addictiveness of tobacco. Table 3.8 below shows the opinions of adults and teens from the Sage 2 survey.

Table 3.8

Percentage of Respondents in Sage 2 (1996) Survey
According to their Opinions on Sponsorship, Banning Manufacture and
Sale of Tobacco and Addictiveness of Tobacco.

	Adults		Teens	
	Smokers (%)	Non-Smokers (%)	Smokers (%)	Non-Smokers (%)
Sponsorship of sporting or cultural events by tobacco companies should be banned	26	45	24	52
By the year 2000, the production and sale of tobacco should be banned	20	41	17	51
Tobacco is not as addictive as other drugs e.g., heroin and Cocain	18	14	38	23

It is not surprising that the support for banning the sponsorship of sporting and cultural events and for totally banning the manufacture and sale of tobacco products is much higher among the non-smokers than smokers. The support is even higher among teen non-smokers than adult non-smokers. Approximately, the same percentage (between 15 and 20%) of adult smokers and non-smokers believe that tobacco is not as addictive as other drugs such as cocain and heroin. **However, about two in five teen smokers believe that tobacco is not as addictive. There is probably more opportunity for educating early teens about the relative addictiveness of tobacco**.

Though, similar data were presented for each of the six smoking continuum groups separately, the results of the Sage 1 surveys were not summarised by smokers and non-smokers. Comparison between the findings of the two surveys was, therefore, not possible.

Table 3.9 below shows the awareness of health risks among the smokers from their own smoking habit.

Table 3.9

Percentage Distribution of Smokers According to Their Awareness of the Effect of Smoking on Their Own Health

	Adults		Teens	
	Sage 2	Sage 1	Sage 2	Sage 1
	(1996) (%)	(1995) (%)	(1996) (%)	(1995) (%)
My smoking is harmful to my health	56	59	53	52

More than half of the adult and teen smokers were aware that their smoking was detrimental to their health.

About 35% of adults and 60% of teens believed that people were smoking more because of the reduction in prices. However, only about 5% of adult smokers stated that they were smoking more because of the reduction in tobacco prices. Twenty percent of teens in 1995 and 27% in 1996 responded that they were smoking more as a result of the reduction in prices.

Tandemar surveys found that Health Canada media campaign of 1994 was successful in informing the public about the adverse health effects of smoking. This survey also found that while the campaign message was relevant, not many people thought that it provided

information they did not already know. With so many federal, provincial and private sector organizations providing information on the adverse effects of smoking, it is not surprising that many people already knew about the ill effects of smoking.

The Youth Smoking Survey - 1994 (YSS) found that a very high proportion of youth were aware of the harmful effects of smoking; 91% felt that smoking is addictive and 90% thought that ETS was harmful to health. Table 3.10 below shows the beliefs of Youth regarding harmful effects of smoking and ETS by province and age groups.

Table 3.10

Percent of Youth Who Believe That Smoking is Addictive and ETS is Harmful to Health

	Smoking is Addictive		ETS is Harmful to Health	
Age Groups	10-14 (%)	15-19 (%)	10-14 (%)	15-19 (%)
Canada	85	96	84	96
Newfoundland	93	98	88	98
Prince Edward Island	93	98	88	98
Nova Scotia	90	97	89	98
New Brunswick	84	98	83	96
Quebec	74	95	83	96
Ontario	87	97	83	96
Manitoba	91	98	87	97
Saskatchewan	93	99	86	97
Alberta	91	98	87	97
British Columbia	90	96	86	98

Source: Youth Smoking Survey 1994, Technical Report.

The proportion of respondents who felt that smoking was addictive, and ETS was harmful was much higher in the YSS than in Sage surveys. Similarly, the proportion of respondents who felt that government should ban sponsorship of sporting and cultural events by cigarette companies was significantly higher in OADOS than in Sage surveys. However, these differences could be due to the differences in methodology and question wording.

In summary, a very high proportion of Canadian adults and teens are aware of adverse effects of smoking and ETS on health. Adults and teens both feel that the Health Canada (TDRS) campaigns clearly bring out the health issues related to smoking. Tandemar survey

found that though the respondent found Health Canada campaigns relevant, they did not contain any new information.

There were significant differences in the estimate of support for banning sponsorship of sporting and cultural events by cigarette companies found by Sage and other surveys. Almost two-thirds of adult and teen smokers were aware of the dangers to their health from smoking. Because of many anti-smoking campaigns before and concurrent with TDRS, it is not possible to attribute public awareness and attitudes to specific campaigns (including TDRS).

Municipal Policies and Bylaws Restricting Smoking

There were two surveys of municipalities, one in 1990 and the other in 1995. The aim of the 1995 survey was to obtain information from all the municipalities with populations over 10,000 and include additional municipalities with lesser populations until at least 75% (60% in provinces with large rural populations) of the provincial population was covered.

Information obtained from both surveys was used to update databases on municipal by-laws on smoking. The databases are "updates" and not results of specific surveys. The 1991 database is presented in 14 tables and the 1995 database in 15 tables, each table containing alphabetical listings of municipalities showing different types of by-laws passed by the municipalities. With the exception of one table in the 1995 database showing by-laws by broad category, all other tables in both the databases present alphabetical listings of municipalities for Canada as a whole, (i.e., without identification of the province). Therefore, it is possible to tabulate municipalities with by-laws affecting broad categories of areas (e.g., hospitals, day care centres) for **1995 update only**.

Table 3.11 on the next page shows the number of municipalities included in 1991 and 1995 databases.

Table 3.11
Table Showing the Number of Municipalities in the 1991 and 1995 databases, by province.

	1991 Database	1995 Database
Canada	280	380
Newfoundland	---	1
Prince Edward Island	1	2
Nova Scotia	4	5
New Brunswick	1	23
Quebec	58	72
Ontario	118	147
Manitoba	11	11
Saskatchewan	18	26
Alberta	13	33
British Columbia	55	57
Northwest Territories	1	2
Yukon	---	1

The number of municipalities with smoking related by-laws has increased from 280 to 380, or by about one-third, between 1991 and 1995. These numbers, however, do not show the percentages of population covered by anti-smoking municipal by-laws.

The table 3.12 below provides comparisons between the numbers of municipalities with selected categories of by-laws from the 1991 and 1995 databases.

Table 3.12

Areas Of By-laws	1991 Database	1995 Database
Hospitals Facilities	50	103
Patient Care Areas of Hospitals	56	46
School Buses	93	90
Restaurants	146	143
Licensed Establishments	45	55

The number of municipalities with restrictions on smoking in hospitals has almost doubled between 1991 and 1995. Because of the nature of the databases, it is not possible to explain the reasons for the apparent decline in the number of municipalities with restrictions on smoking on school buses and restaurants.

In summary, the number of municipalities with by-laws affecting smoking in different places has increased by almost 33% between 1991 and 1995. However, the 1995 inventory still has only 380 municipalities. Three hundred sixty municipalities out of 668 municipalities reached by the 1995 survey did not have any by-laws related to smoking. Caution should be exercised in interpreting data from the databases. Powers for making by-laws with respect to smoking and delegation of powers to municipalities may vary from province to province.

Restrictions on Smoking in Canadian Schools

The 1990 survey of schools obtained information from 6572 schools and 576 school boards. The survey found that about 98% of schools in Canada had non-smoking policies in place. About 59% had a totally smoke-free policy. About 97% of schools had some restrictions on smoking by staff, 67% had a totally smoke-free policy for the staff and 76% did not allow staff to smoke inside the school building. The 1990 survey also found that 84% of schools had a totally smoke-free policy for the students, and 93% did not allow smoking inside the school building.

The National Survey of Programs on the Prevention of Tobacco Use in Schools (1992-1993) asked schools about the restrictions on smoking during and after school. Table 3.13 below shows the percent of schools in Canada with ban on smoking for students as well as for teachers. The survey report provides information by provinces and territories and by type of schools (primary and secondary). However, the number of schools in most categories were under 20. Therefore, the data by province and territories is not presented here.

Table 3.13

Percent of Schools with Ban on Smoking by Students and Teachers by Type of Schools (1992 - 1993)

	Primary Schools		Secondary Schools	
Restriction Affecting	Students	Teachers	Students	Teachers
During School Hours	88.9	73.4	48.0	52.0
After School Hours	87.9	72.5	51.0	53.1

One would expect that more schools will have ban on student smoking during school hours than after school hours. For the secondary schools, the survey data are not consistent with this notion. However, the data show that close to 90% primary schools and 50% secondary schools

in the sample have anti-smoking restrictions on students. About 75% of primary schools and 50% of secondary schools also have restriction on smoking by teachers.

The 1995 survey of 4175 schools found that almost all (97%) of schools have some type of policies to control smoking. This percentage is 1% lower, but not significantly lower, than that found in the 1990 survey. The lower rate could be due to the differences in sampling methods and/or questionnaires.

The 1992-93 survey reported a much lower percentage of schools having smoking policies in place than 1990 and 1995 surveys. However, the 1992-93 survey had a much smaller (effective) sample size of 118 school boards and 227 schools. The 1990 survey had an effective sample of 536 school boards and 6572 schools, while the 1995 survey had 4175 schools. Data from the 1990 and 1995 surveys were used to examine changes in the number of schools with smoking policies.

Table 3.14 below shows the provincial percentage distribution of the school boards with total and partial ban on smoking for students. Total ban, for the purpose of this table is defined as prohibition of student smoking "total smoke-free at all times or during school hours" for the 1990 survey; or "either indoors and outdoors, or indoors but not outdoors" for the 1995 survey.

Table 3.14

Percentage Distribution of the School Boards with Total and Partial Ban on Smoking for Students

Year Province	Total Ban 1990	Total Ban 1995	Partial Ban 1990	Partial Ban 1995
Canada	66	83	32	11
B.C.	49	89	48	2
Alberta	71	87	26	5
Sask	69	86	26	2
Manitoba	71	93	26	---
Ontario	77	97	22	---
Quebec (*)	12	34	88	57
N.B.	36	89	61	1
N.S.	80	91	19	3
P.E.I.	41	97	59	---
N.F.	64	92	31	---

The table shows that while the percentage of the schools with some non-smoking policies have not changed between 1990 and 1995, significantly more schools have more restrictive policies for student smoking.

In summary, the percentage of schools with non-smoking policies was very high prior to the introduction of TDRS. This percentage has more or less has remained the same. However, there is a significant increase in the number of schools with more stricter non-smoking policies.

Smoking Policies in other Public and Commercial Settings

In 1995, as part of a larger national study on smoking policies in a number of public settings the following surveys were undertaken:

a. a telephone interview survey of 100 large Canadian companies covering the four sector of retailing, food services and hotels, commercial landlords and bus terminals,
b. a survey of 2,396 (approximately 56% of such facilities in Canada) hospitals, long term and chronic care facilities, and other residential care centres,
c. a survey of about 2,554 (approximately 30% of such centres in Canada) licensed daycare centers, and
d. interviews of 198 daycare agencies for voluntarily licensed private home day-care.

Summary reports for these surveys were available for the analysis. The reports did not include information on the sampling methodology, size of the universe and response rates. It is, therefore, not possible to assess the reliability and quality of the survey data.

Smoking Polices in Commercial Settings

The telephone survey included 100 large Canadian businesses (typically with over $100 million in annual sales) covering four commercial sectors; namely, food services and hotels, commercial landlords and bus terminals. Most of the companies are (or appear to be) multi-establishment. With the exception of hotels, the public visiting commercial settings for a relatively short period of time. However, the clients of the hotels, generally, substitute the hotel as their home away from home. They may expect to be able to smoke in their rooms.

Most of the commercial establishments surveyed have some form of a smoking policy. About 55% of all policies designate indoor smoking areas that are not separately ventilated, thereby, exposing the public as well as employees to second-hand smoke (ETS). If effectively enforced, only about 30% of all policies have the potential to protect the public from ETS.

Smoking Polices in Health Care Institutions

In an earlier section, information obtained from municipalities about their policies restricting smoking in hospitals in their jurisdiction was presented. This section discusses information obtained from hospitals, long term and chronic care facilities, and other residential care centres. Table 3.15 below page gives the distribution of smoking policies by province.

Table 3.15

Percent of Health Care Institutions with Written and Unwritten Polices by Province

Province	Written Policies	Unwrtitten Policies	No Policies
Canada	83	13	4
B.C.	83	15	2
Alberta	94	6	0
Sask	84	12	4
Manitoba	88	10	2
Ontario	87	10	3
Quebec	78	15	7
N.B.	59	26	15
N.S.	81	17	2
P.E.I.	90	10	0
N.F.	73	24	3

Overall, 96% percent of all institutions surveyed have either a written or an unwritten smoking policy. With the exception of New Brunswick, over 93% of health care institutions in all other provinces have either a written on an unwritten smoking policy. Thirty-one percent of the health care institutions specify taking formal disciplinary measures and 9% specify fines.

As in the case of hotels, the inmates of the health care institutions are there usually for a longer stay. And, unless they are under the instruction from their physicians not to smoke, they may expect to have a place (indoor or outdoor) where they can smoke. Only 3% of policies prohibit smoking indoors and outdoors.

The health care sector is acutely aware of the dangers of smoking and exposure to ETS. If enforced, 60% of all places could provide protection from second-hand smoke inside health care facilities.

Smoking Polices in Daycare Centres and Agencies

The survey included 2,554 licensed daycare centres and 198 daycare agencies. The summary report does neither clarify the relationship between the daycare agencies and the home childcare nor provide details on the number of daycare agencies across Canada.

Table 3.16 below shows percent of daycare centres with smoking polices by province.

Table 3.16

Percent of Daycare Centres with Written and Unwritten Polices by Province

	Written Policies	Unwrtitten Policies	No Policies
Province			
Canada	46	47	7
B.C.	34	57	9
Alberta	61	33	6
Sask	76	24	0
Manitoba	51	41	8
Ontario	50	46	4
Quebec	36	57	7
N.B.	35	55	10
N.S.	31	54	15
P.E.I.	56	43	1
N.F.	49	51	0

The daycare facilities are much different from other public places. Children attending daycare centres are generally too young to smoke. However, all children, whether they are in a licensed daycare or a home childcare, could be subject to ETS, if there are no restrictions on smoking by the care givers.

Almost all (93%) licensed daycare centres have either written or unwritten smoking policies. Further, 51% of daycare centres with smoking policies ban smoking both indoors and outdoors.

Only 62% of daycare agencies regulate smoking in home daycare settings, 45% have written policies and 17% unwritten policies. Nineteen percent of the daycare agency policies provide

for revoking the license of the day-care home and 38% for dismissing the child care giver who disregard smoking restrictions

Thirty-eight percent of daycare agencies have no policies restricting smoking in home daycare setting. This is not to say that all children in these homes are subjected to ETS, but rather that their exposure to ETS depends on the smoking practices of the home care giver.

With the exception of daycare centres in Nova Scotia and New Brunswick, over 90% of daycare centres in all other provinces have some form of smoking policies. Less than 40% of daycare centres in British Columbia, Quebec, Nova Scotia and New Brunswick have written policies.

In summary, a large percentage health care institutions, daycare centres and large commercial settings have policies to restrict smoking and reduce exposure to ETS. However, the level of enforcement on smoking policies varies from sector to sector and within each sector.

Exposure to External Tobacco Smoke in Homes and Workplace

Relevant data were not available to determine whether the TDRS has led to a decrease in the exposure from ETS in homes and workplaces. However, information presented in earlier sections indicate that:

a. the awareness of the dangers to health from ETS is very high among all teens and adults as well as among smokers and non-smokers,
b. the number of municipalities with by-laws restricting smoking in public places under their jurisdiction is increasing,
c. the number of schools with a total ban on smoking is increasing, and
d. a large percentage of health care institutions, daycare facilities and other commercial settings have policies restricting smoking.

This information is consistent with a conclusion that exposure to ETS has decreased over the last few years. However, much of this decrease has occurred before the establishment of TDRS. It is not possible to estimate the changes in the exposure to ETS in homes.

CHAPTER FOUR

PRICE ELASTICITIES AND DEMAND FOR CIGARETTES

Taxes on tobacco sales have been used as a source of revenue by governments in most countries over a long period of time. The effects of changes in taxes on tobacco sales, and consequently on the government revenues, have been the subject of many studies (Galbraith & Kaiersman (1995), The Department of Finance (1993), Mummery W. K. and Hagen. L.C. (1996), and Mckraken M. C. and Jacobson P.M. (1994)).

Consumption of most goods and services decreases with an increase in price and vice versa. Goods and services with price elasticities between 0.0 and -1.0 are suitable targets for increasing revenues through taxation. Most studies of short-run price elasticities of demand for tobacco have found that short term price elasticities range between -0.2 and -0.4. The use of taxation on tobacco has, therefore, been successful as an instrument for raising government revenues. Its use as an instrument for reducing the consumption of tobacco, and consequently, for implementing health policies is of comparatively recent origin.

Total prohibition or (artificially) very high prices of addictive substances create opportunities for black-market through illegal production and/or smuggling. Substantial volumes of smuggling and illegal sales of such substances, which are also available legally, result in a loss of revenues to the government. In addition, total consumption of such addictive substances may not decrease to the extent expected by policy-makers, thereby reducing the effect of an increase in tobacco prices as a health or social policy instrument.

Tobacco is an addictive substance. Sharp increases in tobacco prices in the late 1980s and early 1990s resulted in a flourishing market for illegal sales and smuggling.

Studies on price elasticities have been undertaken to estimate the quantitative relationship between changes in prices and overall tobacco consumption. However, these studies do not generally provide relevant information on the smoking behaviour of individuals in target groups.

This chapter discusses the general concept of elasticities, provides a brief survey of estimates of price elasticities from various studies and underlines the limitations of such estimates for the evaluation of TDRS. It then presents results of a preliminary analysis, by province, of the impact of changes in cigarette prices on cigarette sales and suggests ideas for future work.

The Concept of Elasticity

Smoking cigarettes, pipe and cigars, chewing tobacco, and inhaling snuff are the main modes of consuming tobacco. Cigarettes can bought either as a manufactured product or rolled by the consumers for their own use. Manufactured cigarettes are the more usual form of consuming tobacco in Canada. Data on smoking behaviour are also readily available for cigarette smokers. Most of the analysis of the effect of changes in tobacco prices has, therefore, been done using data on cigarette sales.

Federal and provincial governments have always used tobacco taxes to raise revenues. Lately, however, the accent has shifted to curbing the smoking habit by making it more costly through taxation. From the point of view of public health, the government would like to see a large reduction in tobacco consumption in response to a rise in price resulting from a higher sin tax. Studies have shown, however, that the demand for tobacco falls less than in proportion to the price of tobacco. In the jargon of economists, this is tantamount to saying that the *own price elasticity of demand for tobacco is less than one or unity*. In such a case, where the proportionate change (rise or fall) in consumption is smaller than the change (fall or rise) in price in absolute terms, revenues rise when the price is increased and fall when it is reduced.

The own price elasticity of demand for tobacco is greater than unity if consumption falls (rises) more than in proportion to a given change in price. In such a case, government revenues fall with a fall in price and vice versa. A third case, where tobacco consumption changes in exactly the same proportion as the price of tobacco, own price elasticity of demand is said to be equal to unity. In this case, revenues remain unchanged irrespective of whether the tobacco price is raised or lowered.

Price elasticity of demand can also be estimated with reference to the prices of substitutes. In the case of cigarettes sold domestically, for example, substitutes consist of fine-cut tobacco or smuggled goods. While a rise in its own price will reduce consumption of cigarettes, it could also lead to a rise in the demand for fine-cut tobacco or smuggled cigarettes. One can, therefore, calculate *cross-price elasticity of demand for cigarettes* with respect to prices of the two substitutes. This chapter, however, deals mainly with own-price elasticities of demand for cigarettes.

A distinction is made between short-run and long-run price elasticities of demand. Consider a rise in the price of tobacco occasioned by a rise in tax. Borderline smokers will probably kick the habit right away, while die-hard adherents will only gradually reduce their consumption over the years. In the new regime of higher prices, the proportion of young smokers entering the market will decrease as compared to the previous regime of lower prices. In other words, the long-run impact of a rise in price on the change in consumption will be higher than its

immediate impact, say, over a year. This is tantamount to saying that the *long-run price elasticity of demand* is higher than the *short-run or one-year elasticity*.

The longer it takes for the price of tobacco to work out its effect on consumption, the longer is the so-called "adjustment lag", and the greater is the value of long-run elasticity relative to the short-run. While most studies have found a moderate lag of three to four years between the short-run and full long-run impacts, a tiny minority such as Collishaw and Galbraith (1992) have found a longer lag extending over ten years. A study by Finance Canada (1993), on the other hand, found a short-run elasticity greater than the long-run, implying that smokers overreact in reducing their consumption in the first year in response to a rise in price, and then partly restore it in future years. These points are further discussed below.

It is clear that when governments raise the sinful tax, it is useful for them to have an estimate of price elasticities of demand as a measure of the impact of their action on the consumption of tobacco and as a corollary, on revenues. Economists have conducted several studies to estimate price elasticities of demand for tobacco. They differ not only in the underlying theory or the model used, but also in the particular forms of relationships or equations specified for estimation, and the kind of data used.

Economic theory postulates that tobacco consumption depends upon disposable income, price, and also generally unquantifiable variables such as advertising campaigns for or against the habit. The particular form of the relationship estimated may, however, be linear, logarithmic or semi-logarithmic. The choice will affect estimated values of elasticity. Estimates will also differ according to whether the data are annual, quarterly or monthly; whether they are on a national or provincial basis; and whether they are on a time-series or cross-sectional basis.

The degree of sophistication in econometric techniques used to estimate models also affects estimates of elasticities. Despite major advances in the field, however, econometric estimation is still very much an art rather than a science. Practitioners agree that high-powered estimation techniques and fancy model specifications are no substitutes for good data and a sound a priori notion of the plausible values of various elasticities.

A Brief Survey of Elasticities

While there are still gaps in our knowledge of elasticities, a good deal of knowledge can be culled from various studies done so far. Despite differences in models, specifications of equations, data and econometric techniques, it is possible to discern areas of agreement regarding values of elasticities. Results of a critical review of various studies are summarised below under the following headings: (a) All Smokers, (b) Adjustment Lag, (c) Asymmetry of Price Effects, (d) Own-Price Elasticities by Cohort Groups, (e) Smuggling, (f) Structural Changes, and (g) Income.

(a) All Smokers: A survey of elasticities in Finance Canada (1993) shows that for the US, short-run price elasticities fall in the range of -0.25 to -0.50 and long-run, between -0.4 to -0.7. For Canada, the corresponding estimates are: -0.3 to -0.4 in the short-run and -0.6 to -0.8 in the long-run. The estimates imply that in Canada (or the US), for every one percent rise in the price of tobacco, consumption falls by only 0.3 to 0.4 percent in the short-run, and by .6 to 8 percent in the long-run. To achieve a targeted percentage reduction in tobacco consumption, therefore, price will have to increase by a larger percentage or the price hike accompanied by an active anti-smoking campaign.

Some studies, such as Baltagi and Levin (1986) for the US and Informetrica (1992) for Canada, give very high estimates of long-run price elasticities, at -3.1 and -1.6, respectively. Long-run elasticities in these studies are six times and 14 times larger than the short-run, instead of the general finding of two to three times. Following the convention of the art of econometrics, however, we have to go with the consensus estimates above, unless future studies consistently come up with higher values.

(b)Adjustment Lag: In the so-called partial adjustment demand models, current consumption of cigarettes is postulated to depend upon last year's consumption, own and substitute prices, and income. The coefficient of lagged consumption is called the "coefficient of adjustment" and its value measures the lag required for prices to work out their full impact on consumption. The higher is the value of the coefficient of lagged consumption, the larger is the impact of habit persistence and longer is the lag in adjusting current consumption fully to the new price. A longer lag implies that the long-run elasticity is much larger relative to the short-run elasticity.

A simple example will clarify the concept. Assume that the coefficient of adjustment is 0.66 and the equation relating tobacco consumption to income and prices is linear. The coefficient implies that irrespective of the change in income or prices, habit persistence will lead smokers to consume two-thirds of what they did last year. Further, due to this habit rigidity, a change in price will take 1/1 - 0.66 or approximately three years to work out its full effect.

Most studies have found out the coefficient of lag to be between 0.3 and 0.4, implying that 70 percent of the impact of a change in tobacco price on consumption takes place over 2 to 3 years. An exception is a study by Collishaw and Galbraith (1992) on OECD countries, which found a lag of more than 10 years (the value of the adjustment lag is around 0.9). In this case, habit persistence mainly determines current consumption over the next five years or so, with little impact of changes in income or prices. In their more recent study on Canada, however, Galbraith and Kaiserman (1995) found short-run and long-run elasticities to be almost identical, implying almost no lag in adjustment (the adjustment lag is zero).

Over all, results show that policy-makers have to wait two to three years for the major impact of higher tobacco prices to work itself through consumption.

While long-run elasticity is generally expected to be higher than the short-run (adjustment lag is between 0 and 1), a study by Finance Canada (1993) found a reverse relationship, implying an over-shooting of target reduction in cigarette consumption and then restoration back to higher desired levels over subsequent periods . The result implies an adjustment lag greater than unity. Short-run elasticity in this case is higher than the long-run. However, even in that study, the difference between the short-run (-0.70) and long-run (-0.56) elasticities is not large enough to be considered inconsistent with other studies, which imply a moderate lag of a few years.

Nevertheless, the phenomenon of short-run elasticity exceeding the long-run is an interesting one. It is consistent with the theory that consumers are "forced" to make adjustments to their consumption immediately after the change in price, but later return to their earlier levels of consumption. This could work differently for the case when prices fall from that when they rise. When prices fall, smokers could initially increase their consumption or non-smokers begin to smoke. Soon they would find that they have not obtained more satisfaction (utility) by increasing their consumption or beginning to smoke. They would then reduce their consumption to the earlier level and spend the new found extra cash on other priorities. In the case of price increases, consumers would initially reduce their consumption of tobacco. However, realising that their need for cigarettes has not been totally satisfied, they would make adjustments to other expenditures or shop in black-market to satisfy their need. Purchases in the black-market would result in under-reporting of sales of legal cigarettes and give a false appearance of reduced consumption.

(c) Asymmetry of Price Effects: Most studies assume symmetry of price effects; that is, price elasticity is the same whether one is considering a price increase or a decrease. Young (1983) assumes an asymmetric price response and calculates a short-run price elasticity of -0.34 for a price increase and -0.49 for price decrease. The elasticities imply that smokers are more prone to increase their consumption of tobacco in response to a fall in price than they are to cut it down in the event of a price increase.

(d) Own-Price Elasticities of Demand by Cohort Groups: Coate and others (1981), Harris (1982), Ferrence et al (1991) and Finance Canada (1995) are among a handful of studies which have estimated price elasticities by age-groups. They found the impact of a higher tobacco price on teenagers to be greater than for adults. Finance Canada (1993), for example, found price elasticity of demand for tobacco by teenagers to be higher at -1.0 compared to -0.5 for adults. This result is consistent with the expectation that teenagers have more limited budgets and have little room for manoeuvre to absorb price rises.

(e) Smuggling: Finance Canada (1993) used their study to estimate the amount of smuggling expected in future years. The study contends that smuggling takes place when the level of the tobacco tax rises above a threshold amount. Smokers then find it worthwhile to undertake the risk of buying contraband cigarettes. A decrease in tax, on the other hand, reduces the price differential between legal and contraband and with it, the incentive to buy smuggled goods. The same theory lies behind Galbraith and Kaiserman (1995). Their study concludes that growth of the contraband market since 1987 has created two classes of cigarettes; taxed and untaxed. They derive estimates of sale of contraband and use them to estimate equations for total sales (taxed plus contraband). Their study concludes that price elasticities for taxed and total sales of tobacco are -1.0 and -0.40, respectively. In other words, the percentage reduction in total consumption of tobacco is much smaller than in taxed goods, since smokers switch from legal to contraband in response to a tax hike above a threshold level. An implication of the study is that the government should monitor the illegal tobacco market to ensure that their efforts to curtail tobacco consumption are not vitiated by a parallel growth of the clandestine market.

(f) Structural Changes: We define the term "structural change" to refer to changes in variables other than prices and income. Examples are media campaigns, and various strategies to reduce tobacco demand. Structural changes also include changes in generational tastes and the availability of new products. Structural changes are continuously taking place even as taxes are varied by governments to affect prices. Hidden in the estimates of price elasticities are impacts of these structural adjustments.

Studies undertaken so far have not succeeded in isolating the impact of structural changes from that of prices. The only way an attempt has been made to tackle the problem is through the technique of dummy variables. The simple technique essentially omits outliers from the data in order to obtain high coefficients of correlations and reliable estimates of price elasticity. Alternately, a time-trend is used to capture the gradual evolution of anti-smoking policies such as media campaigns, changing social mores and legislation banning smoking in offices and public places. A more detailed study based on surveys at various points in time is required to meaningfully separate impacts of structural changes from those of tobacco prices.

(g) Income: Discussion so far has centred on price elasticities because governments can influence tobacco consumption by raising prices through higher taxes. Another reason for emphasising price elasticities is that several studies were unsuccessful in incorporating income as an explanatory variable. Among those successful, Galbraith & Kaiserman (1995) estimate income elasticity to be quite low, at about 0.2 in the short-run and .4 in the long-run. The Finance Canada study estimates income elasticity for cigarettes to be 0.1 and for fine-cut tobacco, 0.5. These estimates imply that most people spend only a small part of their rising incomes on pampering the smoking habit.

Scope and Limitations of the Elasticity Studies for the Evaluation of TDRS

Galbraith & Kaiserman (1995), and Mckraken and Jacobson (1994) have pointed out the shortcomings of using price elasticities based only on the sale of legal cigarettes. These studies indicate that it is important to use all cigarette sales (legal and illegal) in examining the effect of price changes on cigarette consumption. It is also equally important to use appropriate prices and quantities of supply of illegal cigarettes in the estimated model.

Factors affecting the black-market for otherwise legally sold goods include:

a) profit margins to make black-market a worthwhile venture and the availability of supply,
b) the risk of apprehension in selling or purchasing products on the black-market and attendant penalties,
c) willingness of customers, subject to ethical and other considerations, to switch to the black-market,
d) the reliability of continued supply, and
e) other factors.

The existence of the black-market essentially results in two inter-related markets, each having its own prices, supplies and characteristics. Any realistic model for examining price - consumption relationship needs to include variables to reflect both the legal and contraband markets.

Secondly, as noted above, existing models do not generally include variables to take into account effects of anti- and pro-smoking campaigns on consumption.

Thirdly, while price elasticity models developed so far are useful in examining the effect of changes in prices on total tobacco consumption, they are not useful in studying the effects of prices on specific population sub-groups; e.g., provincial populations, persons in specific age groups, or persons belonging to specific target groups (e.g., youth, pregnant women, unemployed, etc.). In other words, existing models are not useful in examining or predicting effects of price changes on the prevalence of smoking. They are essentially macro-economic models, unsuitable for a formulation of a comprehensive anti-smoking policy.

TDRS is primarily geared to induce smokers to stop or reduce smoking and non-smokers not to begin smoking. One of its prime objectives is also to make individuals in target groups (pregnant women, youth, itinerants, etc.) aware of adverse health effects of smoking or ETS. To effect changes in the smoking behaviour of specific groups at risk is very much the objective of the TDRS.

Cross-sectional and time series data on disposable incomes, smoking habits, expenditures on tobacco products (by target groups), and cigarette prices would be needed to study the effects of changing prices on smoking habits and tobacco consumption. Data from SOSIC type surveys would be ideal for such analysis.

Effect of Prices on Provincial Sales of Cigarettes

When the federal government reduced taxes on tobacco in 1994, some provinces followed suit while others kept their taxes at the same level. This created a further price differential between prices of cigarettes in different provinces. The effects of these differing reductions in taxes on cigarette sales are examined for each province using a simple model which relates per capita cigarette sales to per capita real personal disposable income and provincial real price indices for cigarettes for the period, 1981 to 1995. It would have been ideal to use cigarette consumption per smoker as the dependent variable. However, in the absence of reliable and consistent annual data on the prevalence of smoking at the provincial level, per capita cigarette sales was used as a proxy.

Provincial cigarette sales data are not available for the years, 987 and 1988. These data were estimated by interpolating between the years 1986 to 1989. It is possible that this approximation has affected results. In the absence of firm data, however, there was no alternative to introducing this approximation.

The following simple model was used for estimating price elasticities at the provincial level. Price elasticities for each province were calculated separately.

$$C_t = \exp^a P_t^b Y_t^g C_{t-1}^d \quad \text{.....(1)}$$

$$\text{Ln } C_t = a + b \text{ Ln } P_t + g \text{ Ln } Y_t + d \text{ Ln } C_{t-1}$$

where C_t is the volume of per capita cigarette sales in year t, P_t is the index of real price of cigarettes in year t, Y_t is real personal per capita disposable income in year t, and C_{t-1} is the volume of per capita cigarette sales in year t-1, a is a constant, b and g are short-run price and income elasticities, respectively, and d is the coefficient of adjustment. Long-run price and income elasticities are calculated as (b/1-d) and (g /1-d).

The constant and values of elasticities were estimated using a multiple regression technique on the logarithmic transformation of equation (1). The following regression equation was used in the estimation of price elasticities:

$$\text{Ln } C_t = a + b \text{ Ln } P_t + g \text{ Ln } Y_t + d \text{ Ln } C_{t-1} + e \text{ ..... (2)}$$

If the coefficient of adjustment d is assumed to be zero, equation (2) reduces to:

$$\text{Ln } C_t = a + b \text{ Ln } P_t + g \text{ Ln } Y_t + e \ldots\ldots\ldots\ldots (3)$$

Both the lagged (equation 2) and unlagged (equation 3) versions of the model are used in estimating price and income elasticities. Elasticities based on the lagged model are tabulated in Table 4.1 and those based on the unlagged model in Table 4.2. (presented at the end of this chapter)

The data were available for the period, 1980 to 1995. Elasticities were calculated using data for period, 1981 to 1993 (1980 data were not used because of the unavailability of 1979 sales figures). The estimated equation was also used to forecast cigarette sales for the years 1994 and 1995, two years following the reduction in taxes and the introduction of TDRS. The purpose of this analysis was to compare differences between estimated and observed sales for the years 1994 and 1995.

Analysis of Provincial Elasticities

Detailed tables of the analysis (Tables 4.1 to 4.3) are included on pages 60 to 62.

Table 4.1 gives estimates of price and income elasticities of demand by province on the assumption that there is a lag in the adjustment of desired tobacco consumption to actual levels (equation 2). In this model, the coefficient of adjustment is assumed to be non-zero and short-run elasticities differ from their long-run values. Long-run elasticities are estimated as the short-run divided by one minus the coefficient of adjustment. Given the small sample size, however, it is doubtful whether it is possible to obtain a reliable estimate of the coefficient of adjustment. Table 4.2, therefore, estimates elasticities on the assumption that the coefficient of adjustment is zero (equation 3). This model assumes an instantaneous adjustment of actual tobacco consumption to its desired level so that short-run and long-run elasticities are identical. Table 4.3 compares predicted values generated by elasticities in the two tables with observed values in order to find out which of the two models generates more accurate forecasts.

An analysis of results in Tables 4.1 (lagged version) and 4.2 (unlagged version) leads to the following conclusions:

1. The coefficient of adjustment (d) reported in Table 4.1 is not statistically significant from zero for all provinces except Newfoundland. Even for that province, the coefficient is quite low (0.156) indicating almost instantaneous adjustment of desired to actual tobacco consumption. While we may not believe actual quantitative estimate of d in view of the small sample, but only their qualitative or directional implications, it can

quite moderate, say, not more than a couple of years. This is an encouraging conclusion for formulating a policy to reduce the smoking habit through higher tobacco prices brought about by higher taxes.

Small sample size may be one reason for the failure to estimate the lag. Another reason, a related one, could be the high correlation between the price of tobacco and lagged consumption. In Ontario and Quebec, for example, coefficients of correlation between the two variables are 0.95 and 0.92, respectively. This makes it difficult to estimate their separate impacts. A larger sample size could break multicollinearity and make it possible to derive a reliable estimate of the coefficient of adjustment. Till then, it is safe to assume the consensus estimate of a moderate lag.

2. The coefficient of tobacco price, which measures price elasticity, is significant for all provinces in both the tables. The remarkable thing is that the estimates computed from the unlagged version (Table 4.2) are quite close to those estimated from the lagged version (Table 4.1), confirming the former values. The modal values of elasticities fall within the range of -.5 to -.6, supporting the evidence from the survey above that price elasticities are significantly below unity.

3. The coefficient of the income variable is not significantly different from zero for a majority of provinces in either table. In fact, it is significant with the correct positive sign for only one province (Manitoba) in the lagged model and for two provinces (Manitoba and Nova Scotia) in the unlagged model. Income elasticities for these provinces are close to or lower than price elasticities. This result is consistent with the evidence from the survey that income elasticities of demand for cigarettes are significantly below unity.

4. The almost ubiquitous statistical significance of the price variable, unlike the income variable, implies that tobacco price is a more pervasive and consistent determinant of tobacco consumption than disposable income.

Elasticities in Tables 4.1 and 4.2 were estimated using data till 1993. Table 4.3 uses these estimates to predict cigarette consumption by province for the years 1994 and 1995.

An analysis of Table 4.3 shows that both the models generally overestimate consumption in 1994 and 1995. The result could imply that media campaigns and a gradual tightening of spatial restrictions on smoking offset the impact of a decline in cigarette prices. This conclusion applies with particular force to Ontario, Quebec, Manitoba, New Brunswick and P.E.I., which, with the exception of Manitoba, had matched the federal initiatives to lower taxes to combat smuggling.

Secondly, overestimation is higher in 1995 than in 1994 implying that the impact of anti-smoking initiatives had spread to a larger proportion of the population in 1995 relative to 1994, or that the message was more forcefully seeping into the peoples' psyche, inducing them to make drastic reductions in smoking

Thirdly, Alberta is the only province where the models consistently underestimated actual consumption in the two years. The reason for this result could be found in the general attitude of Albertans towards smoking and the effectiveness of anti-smoking campaigns in that province.

Suggestions for Future Work

When the Federal Government reduced its taxes on tobacco in 1994, New Brunswick, Nova Scotia, Ontario, Quebec and P.E.I. followed suit. The remaining five provinces did not reduce their taxes. This created a differential in prices of tobacco products among the provinces. Further analysis could be undertaken pooling provincial data into two groups according to whether the provinces matched the federal tax reduction or not. This pooling of data will provide more observations for estimating elasticities.

Moreover as described above, there is a need for more relevant disaggregated data in order to get a better insight into the effects of price changes on the smoking behaviour of special cohort populations. Such analysis could, for example, provide information on the quantitative effects of prices on the smoking behaviour of youths between the ages of 10 and 18, pregnant women, and people in different occupations. Different groups have different incomes, live/work under different environments and have different attitudes towards the smoking habit.

A study of differences in responses of the these groups to price changes could provide additional valuable input to the formulation of a more realistic and effective anti-smoking policy and initiatives.

Table 4.1

Results of Estimation of Elasticities Using a Model With Lagged-Adjustment

		Prices		Income		Last Year's Sale		
Province	Constant	Elasticities	T-Value	Elasticities	T-Value	Elasticities	T-Value	R-Squared
Canada	11.634	-0.557	-5.33	-0.208	-0.73	0.053	0.39	0.985
B.C.	12.656	-0.642	-5.62	-0.076	-0.33	-0.196	-0.91	0.991
Alberta	3.698	-0.332	-2.32	0.317	0.83	0.298	1.17	0.977
Sask	8.633	-0.566	-10.13	0.147	0.56	0.009	0.15	0.990
Manitoba	4.419	-0.542	-7.59	0.557	2.10	0.038	0.44	0.990
Ontario	13.144	-0.498	-3.20	-0.501	-1.20	0.185	0.79	0.969
Quebec	14.100	-0.551	-9.46	-0.478	-2.11	0.057	1.11	0.990
N.B.	6.694	-0.373	-2.72	0.095	0.18	0.217	1.57	0.969
N.S.	5.981	-0.563	-9.85	0.467	1.45	-0.041	-0.66	0.984
PEI	9.751	-0.460	-9.39	-0.121	-0.37	0.139	1.64	0.983
N.F.	19.830	-0.583	-10.62	-1.132	-3.90	0.156	2.07	0.981

Regression Equation used in the estimation of coefficients:

$$\text{Ln } C_t = a + b \text{ Ln } P_t + g \text{ Ln } Y_t + d \text{ Ln } C_{t-1} + e$$

using data for the years 1982 to 1993. Degrees of Freedom = 8

Table 4.2

Results of Estimation of Elasticities Using a Model Without Lagged-Adjustment

Province	Constant	Prices Elasticities	Prices T-Value	Income Elasticities	Income T-Value	R Squared
Canada	11.458	-0.607	-24.81	-0.123	-0.53	0.987
B.C.	9.186	-0.556	-28.27	0.092	0.45	0.990
Alberta	7.698	-0.489	-18.45	0.220	0.69	0.978
Sask	8.831	-0.574	-31.41	0.137	0.73	0.992
Manitoba	5.641	-0.557	-29.09	0.466	2.25	0.991
Ontario	13.697	-0.625	-16.60	-0.348	-1.04	0.973
Quebec	12.987	-0.634	-25.24	-0.275	-1.23	0.988
N.B.	5.789	-0.566	-14.94	0.456	1.15	0.966
N.S.	5.024	-0.535	-23.63	0.520	2.04	0.986
P.E.I.	8.133	-0.543	-19.04	0.198	0.64	0.979
N.F.	20.888	-0.677	-17.49	-1.080	-3.55	0.975

Regression Equation used in the estimation of coefficients

$$\text{Ln } C_t = a + b \text{ Ln } P_t + g \text{ Ln } Y_t + e$$

Coefficient of adjustmen is assumed to be zero for this model, using data for the years 1981 to 1993.
Degrees of Freedom =10

Table 4.3

Observed Cigarette Sales and Estimated Sales Using Models with and Without Adjustment Lag
By Province for 1994 and 1995

Model		Lagged	Unlagged		Lagged	Unlagged
	Observed	Estimated	Estimated	Observed	Estimated	Estimated
	Sales	Sales	Sales	Sales	Sales	Sales
	1994	1994	1994	1995	1995	1995
Province						
Canada	1562	1637	1696	1539	1720	1748
B.C.	1175	1397	1351	1082	1434	1368
Alberta	1781	1334	1410	1624	1380	1431
Sask	787	1368	1372	868	1387	1391
Manitoba	1315	1385	1402	1039	1401	1422
Ontario	1665	1638	1863	1704	1830	1945
Quebec	1793	1771	1925	1763	1910	1964
N.B.	1171	1415	1603	1298	1544	1665
N.S.	1548	1555	1526	1583	1641	1622
P.E.I.	1363	1495	1548	1519	1606	1617
N.F.	816	1281	1330	774	1305	1359

Report of the
Evaluation of the Tobacco Demand Reduction Strategy
Part III

Appendices

Evaluation of the Tobacco Demand Reduction Strategy
Objectives of the Evaluation Study - Part III

The Part III of the Evaluation Study is designed to

1. review methodology and results of surveys, released in 1996, on tobacco use in Canada to determine their relevance and data quality in relation to the evaluation of the TDRS;

2. compare the results of 1996 released surveys with Canadian surveys reviewed earlier (See "Surveys on Smoking and Tobacco Demand Reduction Strategy, Madhu Joshi & Associates, March 1996") to determine whether the surveys released in 1996 provide additional information on the changes that to the tobacco use since the introduction of the TDRS;

3. determine, from survey data and results of media tracking studies, whether there is sufficient evidence that there has been changes (increases or decreases) in the following indicators as a result of the introduction of the TDRS, and further, if these changes are statistically significant:

    a) smoking consumption and prevalence among the TDRS target groups,

    b) awareness/knowledge of the dangers of smoking and of ETS, particularly among TDRS target groups,

    c) public attitude toward tobacco smoking in general,

    d) changes in smoking policies in schools, health facilities, daycare centres, restaurants and other places accessible to the public, and

    e) changes in exposure to ETS in the home, the workplace and public areas;

4. determine whether, in light of the trends observed in smoking prevalence and amount smoked since the introduction of the TDRS, there is any evidence that the 1994 reduction in price had effect on tobacco consumption, particularly among Youth;

5. determine whether the difference (if any) in smoking prevalence and consumption between provinces can be attributed to price differences; and

6. Prepare a report containing the results of items 1 to 5 above. The report will include a series of tables, based on the most reliable data, showing changes in tobacco consumption, awareness of the negative effects of smoking on health and of exposure to ETS.

The study will neither conduct new surveys nor retabulate survey information. It will use results of surveys and media tracking studies provided by Health Canada.

Evaluation Questions Formulated by the Evaluation Framework for the Tobacco Demand Reduction Strategy

1.0 Has the situation (social context) that existed at the introduction of the TDRS changed and in what way?

The answer to this question will provide the overall context which will be assessed on the basis of the following indicators:

1.1 trends in prevalence and amount of tobacco use in the population in general and, more particularly, among the TDRS specific target groups.

1.2 changes in provincial anti-tobacco legislation and municipal by-laws that protect non-smokers from ETS.

1.3 changes in awareness/knowledge of the dangers of tobacco smoking and of ETS among the general public and, more specifically, among the TDRS specific target groups.

1.4 changes in public attitude toward tobacco smoking in general.

1.5 changes in enforcement of legislation at the federal as well as the provincial level.

1.6 changes in smoking policies in schools, health facilities, daycare centers, restaurants and other places accessible to the public.

1.7 changes in exposure to ETS in the home, the workplace and public places.

1.8 increase the priority of tobacco control as a public health issues.

1.9 denormalization of tobacco consumption and the marketing of tobacco. products.

It will not be possible to attribute the changes to the TDRS but it will provide information on the extent to which, and in what direction, the overall context of tobacco smoking has changed. This, however, will not mean that the initiatives undertaken under the TDRS are not effective. There are many reasons that could explain why results of the TDRS initiatives may

not be reflected in the macro statistics, e.g., not sufficient time elapsed for the initiatives to have their full impact, target groups addressed by the TDRS are too small to affect the overall statistics, changing people behaviour takes a long time.

2.0 In light of trends observed in smoking prevalence and amount smoked since the introduction of the TDRS, is there any evidence to support the basic assumption behind the TDRS, i.e., that a decrease in price leads to an increase in consumption?

2.1 To what extent did changes in price contribute to a change in smoking prevalence and consumption, particularly among young Canadians?

2.2 Can the difference in smoking prevalence and consumption among provinces be attributed to price differences?

TDRS Specific Issues

These issues deal with the implementation of the TDRS.

3.0 Has the implementation of the various components of the TDRS been consistent with the objectives of TDRS?

4.0 Have the 11 principles been respected in the design and implementation of the TDRS?

5.0 How and to what extend has the TDRS been coordinated with provincial and NGOs anti-tobacco activities?

6.0 Has evaluation been built in each of the TDRS intervention?

7.0 Has the TDRS built effectively upon services, programs, and other initiatives that existed prior to February 1994? For example, what use has been made of resources such as Quit 4 Life, Diary of a Teenage Smoker, Where There's Smoke..., Smoke-Free, PAL, Kids Decide, etc..?

8.0 Have the mass media promotion objectives and messages been consistent with, and supportive of, other TDRS interventions objectives?

9.0 Have the projects funded under the Community Support intervention been consistent with, and supportive of, other interventions objectives?

10.0 What has been the share of the total effort devoted to prevention, protection and cessation? Was this consistent with the original intent?

11.0 Are the TDRS objectives and interventions consistent with the other priorities and policies of the Department and of the federal government?

12.0 What other programs, policies and legislation of the federal government may have had an impact, positive or negative, on tobacco control?

Interventions Specific Issues

The next set of issues deal with individual federal interventions under the TDRS. Basically, these questions address the extent to which each initiative has been successful in achieving its objectives and in reaching the intended target group. For the purpose of this framework the initiatives are grouped under the seven categories of interventions described in Chapter 1: legislative/Enforcement, Access to Information, Services and Programs, Support for Community Action initiatives, Mass Media Campaigns, Research, International Initiatives.

Legislation/enforcement

13.0 Did legislative and regulatory actions under the TDRS contribute to making tobacco products more difficult to obtain?

13.1 Has enforcement of regulations under the TCPA increased? Has the TSYPA been enforced?

13.2 Has the TSYPA been effective in reducing sales to minors?

13.3 Have education materials been developed and disseminated for retailers and restaurateurs?

13.4 Has there been an increase in retailers' understanding of their obligations under the TSYPA?

Access to Information

14.0 What has been the contribution of the Clearinghouse to the objectives of the TDRS as a result of increased resources?

14.1 Did the non-federal members of the NSTRTU Steering Committee continue their contributions to the Clearinghouse during the life of the TDRS?

14.2 To what extent are the services being used and by whom?

14.3 To what extent is the Clearinghouse used to disseminate the information obtained through research?

Services and Programs

Under this category are initiatives designed for specific TDRS target groups such as pregnant women, youth and priority groups (immigrant youth, people with low income, Aboriginals, etc.). Programs and resource material to be developed may reach people directly or through health professionals, parents, teachers, caregivers or employers.

15.0 What has been the contribution of the services and programs directed at target groups to reducing tobacco use among these groups and in the population as a whole?

15.1 What resource material and/or programs have been developed for what target groups ?

15.2 How have programs/resource material developed for the identified target groups been implemented and used?

15.3 What programs/resource material have been developed to be used in the workplace, schools and places of public assembly and what is the actual use?

15.4 Were the resources material and/or programs developed on the basis of identified needs and have these needs been addressed?

15.5 Are there groups other than those identified in the TDRS that should have been targeted for programs and services because of their actual or potential high use of tobacco?

Support for Community Action

In this category are programs and projects funded through contributions to various community groups.

16.0 What have been the effects of community action projects funded through the

TDRS?

16.1 What programs and services have been introduced through community action initiatives? What groups were targeted? What has been the share of the total devoted to promotion, protection and cessation?

16.2 To what extend have funded projects achieved their expected results? What have been their impact on their target groups?

16.3 Have the projects funded been consistent with the objectives and target groups of the TDRS?

16.4 Did the funded projects contribute to "capacity-building" at the community level?

Mass Media Campaigns

17.0 What has been the impact of media campaigns on target groups in terms of increased awareness, knowledge of the dangers of tobacco smoking and of ETS? What evidence is there of changing attitudes and behaviour?

17.1 What were the target groups addressed by the media campaigns and were these groups reached?

17.2 To what extent have the media campaigns increased awareness of the dangers of tobacco smoking and of ETS among target groups?

17.3 Has message promotion had a discernible impact on media and other opinion leaders (eg. editorial writers, columnists, talk show hosts)?

17.4 Have the observed changes in knowledge/awareness actually affected tobacco consumption?

17.5 Has message promotion been carried out in coordination with the other initiatives of the TDRS and with the provinces?

Research

18.0 Did the research funded through the TDRS provide useful information to plan and evaluate other components of the TDRS?

18.1 What research has been funded and why? What has been the share of share of research devoted to prevention, protection and cessation?

18.2 Was the information needed for designing programs, services, and message promotion of high quality, and was it provided in a timely fashion?

18.3 Is there evidence that the research results were used for designing programs, services, and message promotion?

18.4 Was the research initiative successful in collecting good quality data from all the priority groups?

International

19.0 What initiatives have been undertaken at the international level and what were the results?

Conclusions and Future Direction

20.0 Is there evidence of "collateral positive outcome" (i.e. protection measures may encourage cessation)?

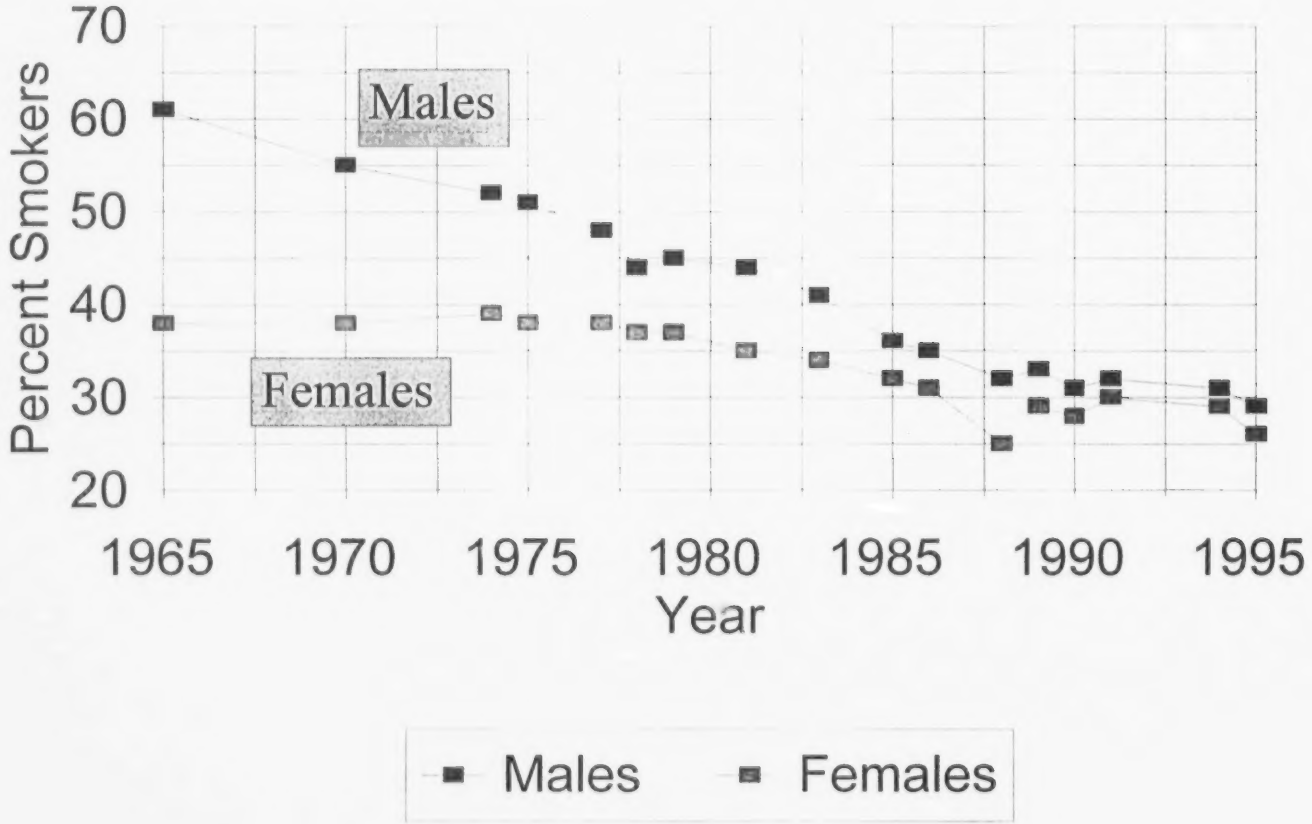
21.0 What lessons have been learned from the TDRS experience and results to date?

22.0 In light of the results achieved through the TDRS, what methods of intervention are the most effective? Are there better ways to achieve the same objectives? What type(s) of interventions should be continued?

Appendix C
Charts and Graphs

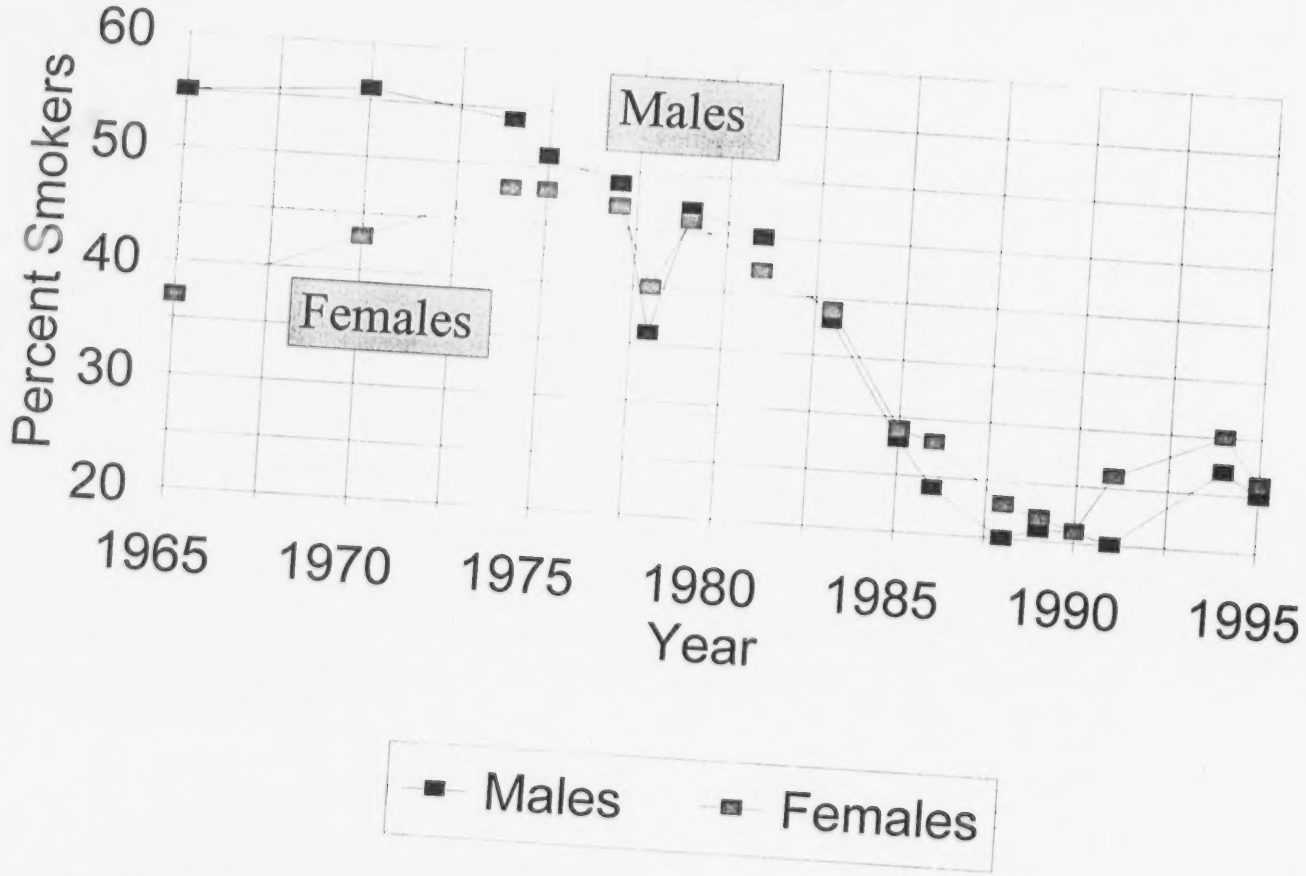
Smoking Prevalence: All Ages

(1965 - 1995)



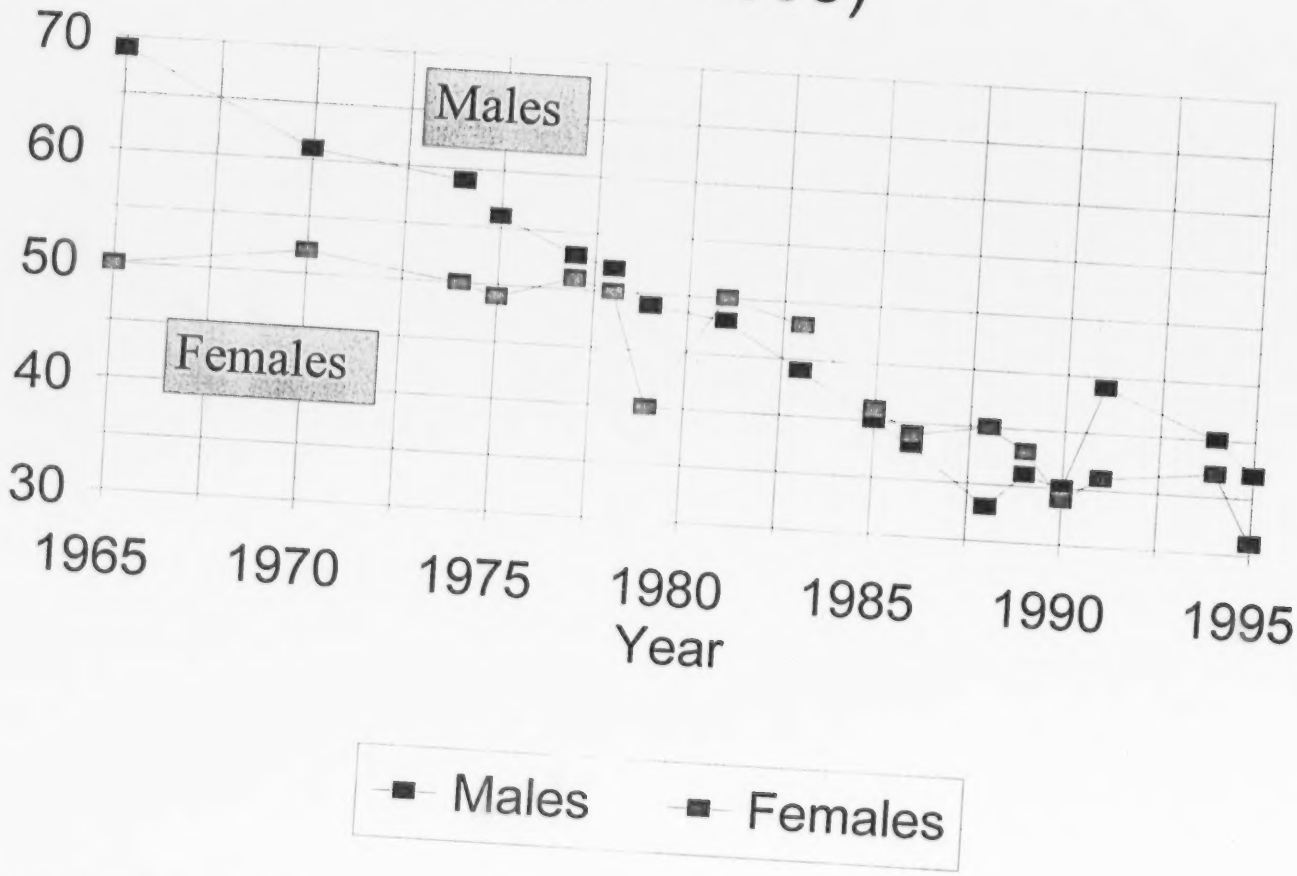
Source: Various Statistics Canada Surveys Including SOSIC

Smoking Prevalence: Age-Group 15 - 19
1965 - 1995



Source: Various Statistics Canada Surveys Including SOSIC

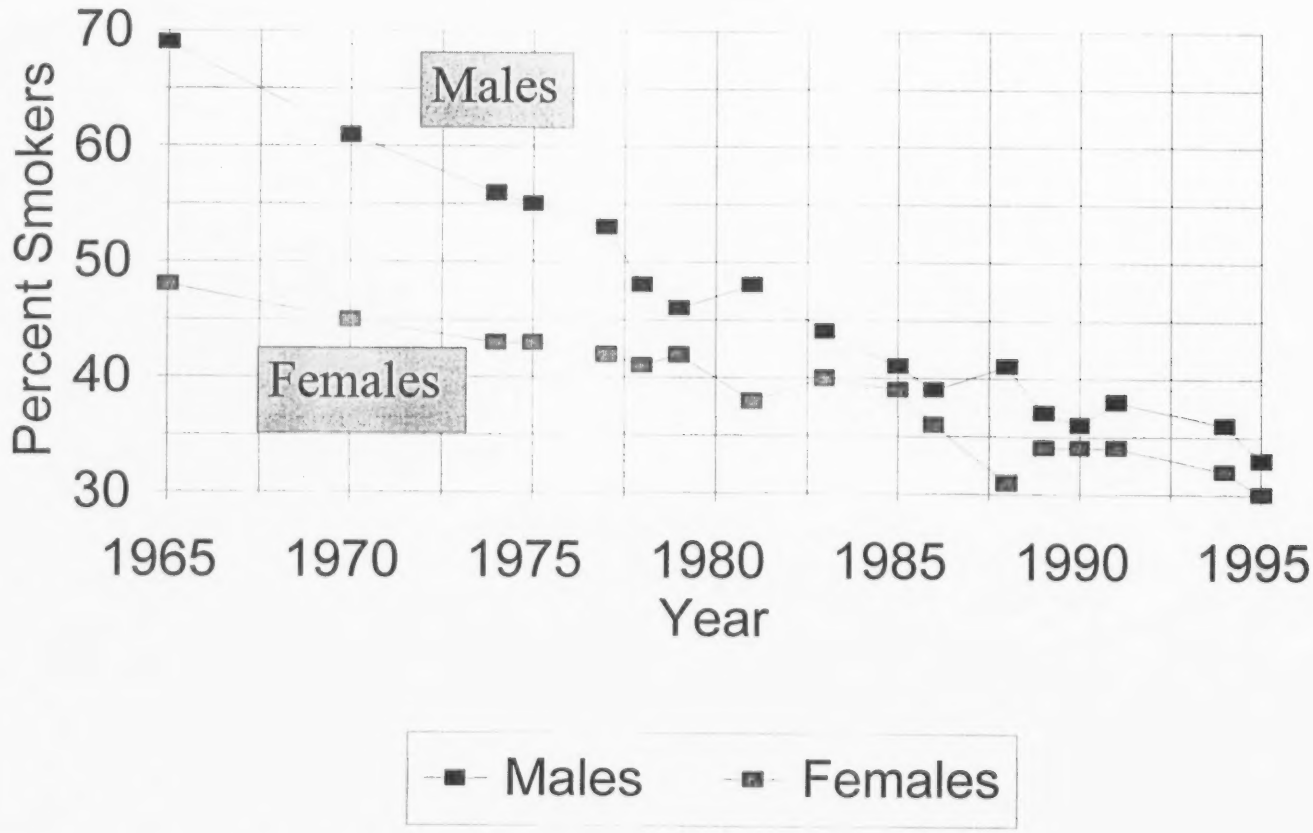
Smoking Prevalence: Age Group 20-24
(1965 - 1995)



Source: Various Statistics Canada Surveys Including SOSIC

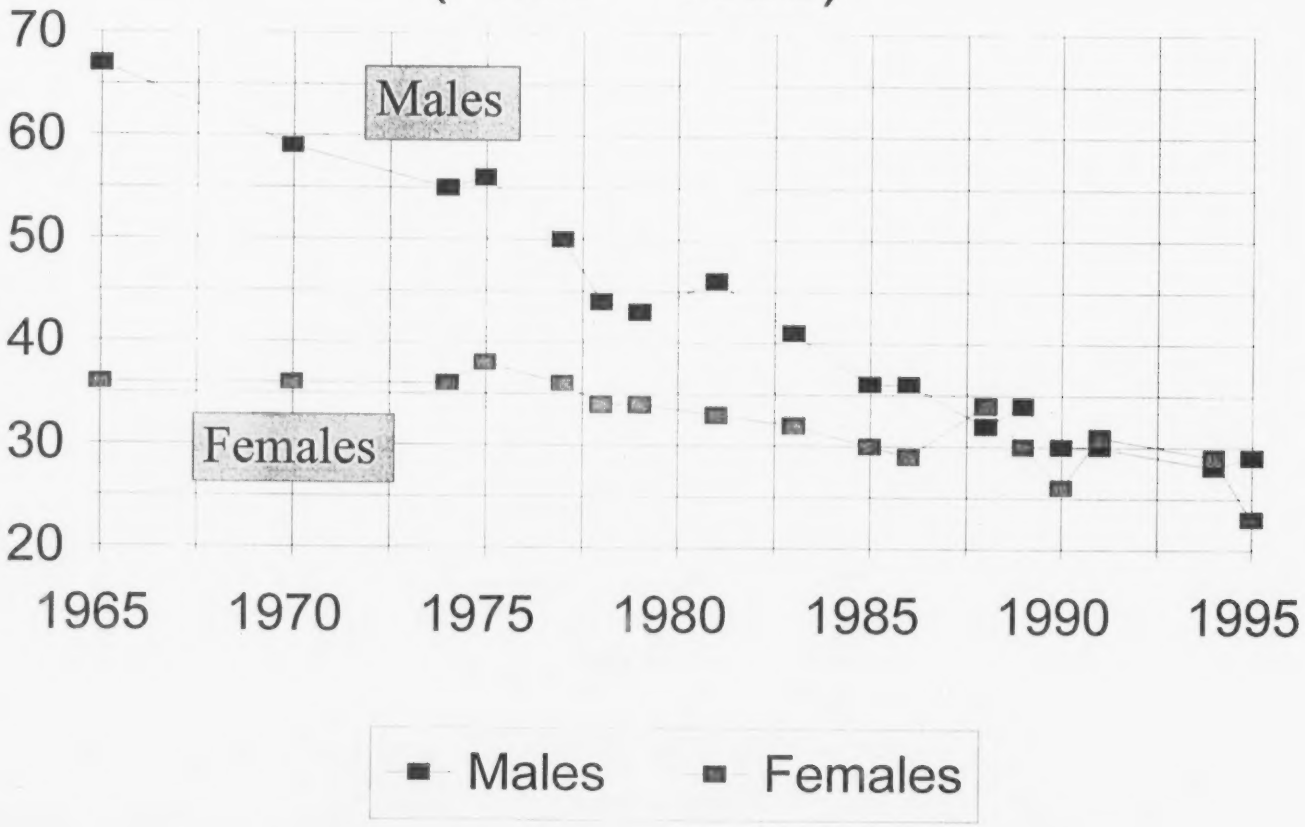
Smoking Prevalence: Age Group 25 -44

(1965-1995)



Source: Various Statistics Canada Surveys Including SOSIC

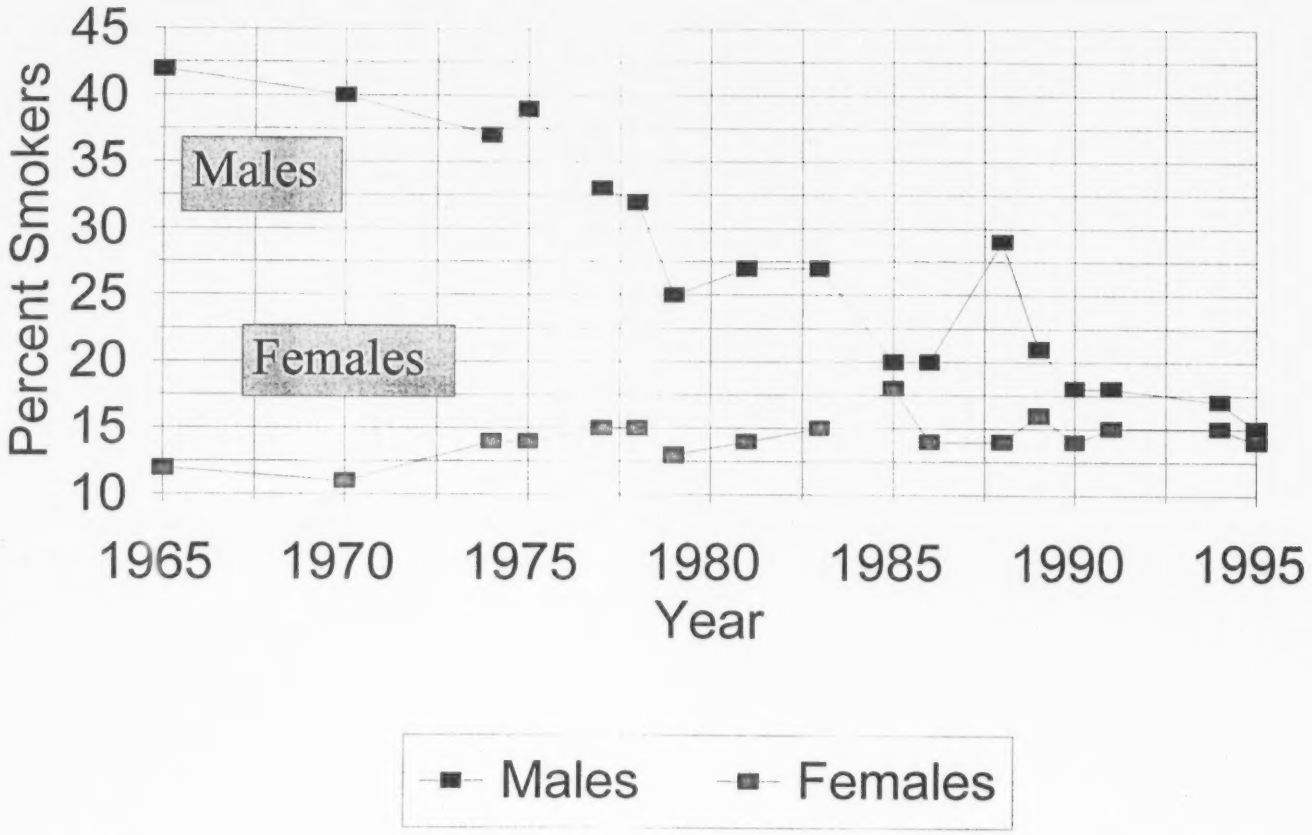
Smoking Prevalence; Age Group 45-64 (1965 - 1995)



Source: Various Statistics Canada Surveys Including SOSIC

Smoking Prevalence: Age Over 64

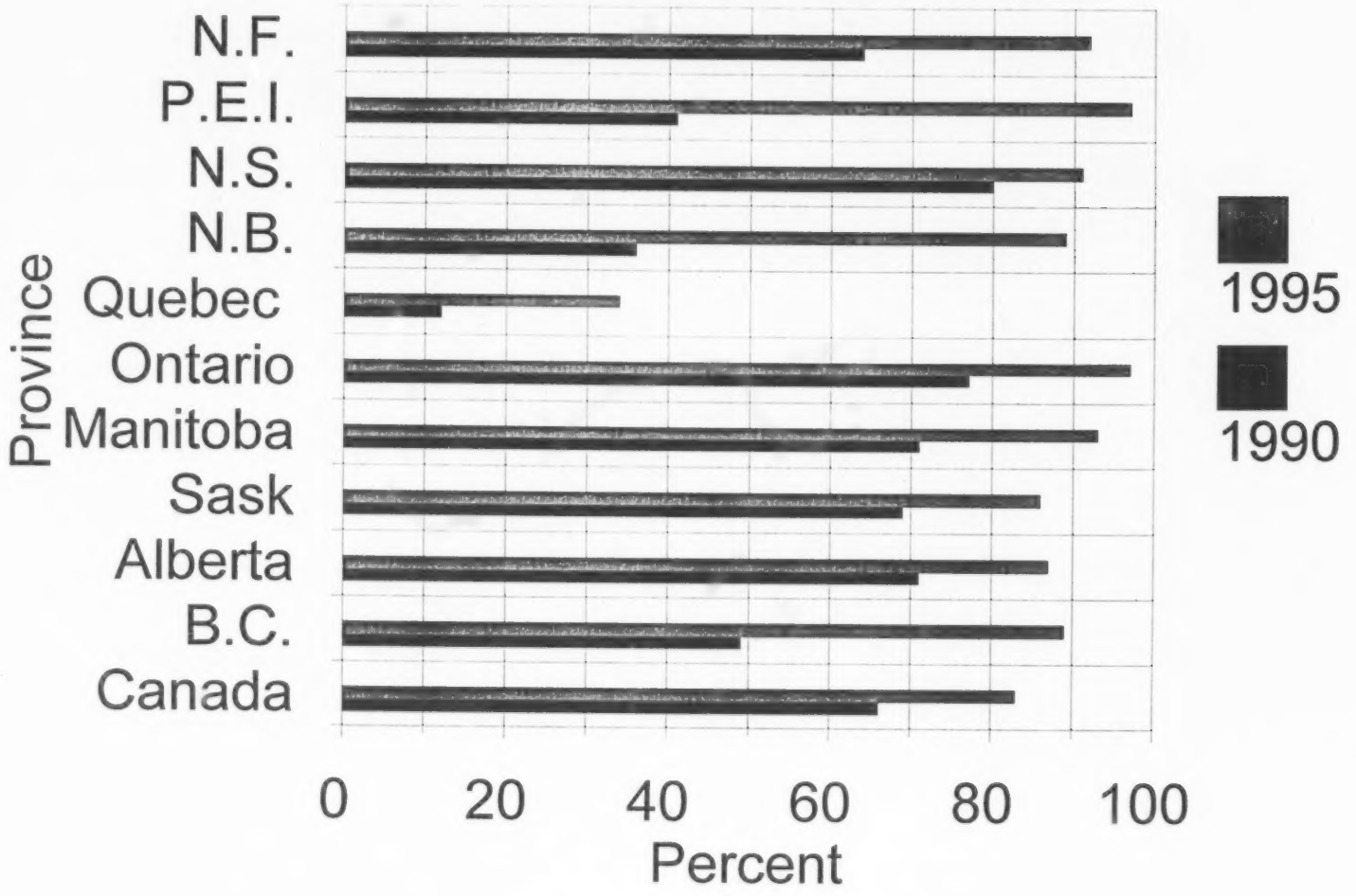
(1965-1995)



Source: Various Statistics Canada Surveys Including SOSIC

Percent Schools with Total Smoking Ban

(1990 and 1995)



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